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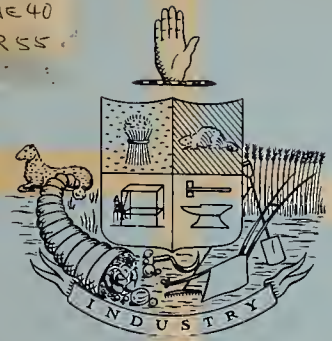

ROAD NEEDS STUDY

IMPROVEMENT PROGRAM

1961

TOWNSHIP OF VAUGHAN

DUNCAN HOPPER & ASSOCIATES LTD. - CONSULTING ENGINEERS

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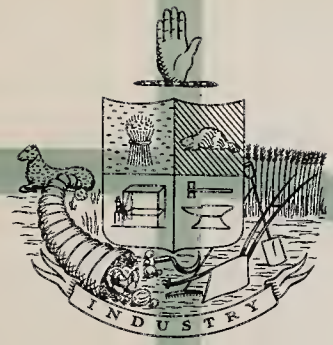

TOWNSHIP OF VAUGHAN

ROAD NEEDS STUDY

IMPROVEMENT PROGRAM

1961

DUNCAN HOPPER & ASSOCIATES LTD. - CONSULTING ENGINEERS

THE CORPORATION OF THE TOWNSHIP OF VAUGHAN

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ACKNOWLEDGMENTS

The Needs Study and the Improvement Program set out in this document were made possible, in large part, by the Municipal Roads and Planning and Design Branches of the Department of Highways, Ontario. Assistance on specific problems of traffic growth and population conditions was freely obtained from the staff of the Metropolitan Toronto Planning Board. No small measure of credit is due the National Association of County Engineers in the U.S.A. whose publication, "Advance Road Programs", provided the basic method by which needs were determined and the program established. To all of these, and particularly to the individuals directly concerned, appreciation is hereby expressed.

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LIST OF PLATES

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4 TRAFFIC VOLUMES AND ESSENTIAL ROUTES

5 NEEDED IMPROVEMENTS

6 PRIORITY LIST

7 RIGHT-OF-WAY WIDTHS

8 LOCATIONS FOR ANNUAL TRAFFIC COUNTS

Steeles Avenue, though falling in the abave category has been amitted from the study. This road is of such importance that it is felt that improvement, when required, should be undertaken by a road authority having higher standards than those for Township rural roads.

Original road allowances which are presently unopened have been considered, and such openings as can be foreseen as necessary or desirable are included in the program.

THE METHOD

The method used to assess needs and arrive at priorities is that developed by the National Association of County Engineers in the U.S.A., as adopted by the Department of Highways, Ontario for use in Counties and Townships.

The Needs Study consists of three principal procedures:

1. The preparation of an Inventory of the physical characteristics of the road system;
2. The assembling of data on Road Use, i.e., the amount and kind of traffic on each section, and;
3. The Approisal of the data so obtained in order to determine the nature and extent of needed improvements.

The Needs Study determines the improvement projects which are needed to bring the road system up to an adequate level of condition and serviceability. It also provides the necessary factual base for sound financial planning, for wise selection and orderly scheduling of improvement projects and, perhaps most important, for achieving informed public support for the municipality's road improvement efforts.

In order to translate the results of the Needs Study into an Improvement Program, it is necessary to follow three more procedures:

1. Financial Planning – to determine the overall size and shape of the program consistent with financial capability;
2. Priority Analysis – to rank needed improvement projects, methodically and impartially, in order of relative urgency;
3. Programming – to assemble needed improvement projects into an actual time-table having proper regard for practical considerations.

The Improvement Program which results is not static but must be reviewed annually and amended as required to meet changing conditions.

SUPPLEMENTARY DATA

Not all of the findings of the Needs Study are included in this document because of their nature and bulk. The data not included are as follows:

1. The records of automatic and manual traffic counts;
2. The data sheets for roads, structures and railway crossings;
3. The appraisal sheets for roads, structures and railway crossings;
4. The detailed program work sheets.

These records will be required for annual review and for complete re-study and are retained for this purpose.

SUMMARY

INTRODUCTION

The roads of the Township require improvement on a planned basis to meet the needs of present and future traffic. Traffic volumes will increase due to increasing population, increasing motor vehicle registrations per unit of population and increasing travel per vehicle.

From data gathered in the Needs Study, a ten year Improvement Program has been formulated in keeping with the financial capability of the Township. The study covered all original road allowances, except Steeles Avenue, plus three main subdivision roads in the First Concession connecting Bathurst and Yonge Streets.

Needs have been determined and priorities assigned by the methods developed by the National Association of County Engineers in the U.S.A. as modified by the Department of Highways, Ontario for use in Counties and Townships.

The Improvement Program has been detailed having due regard for the relative priority of needed projects and the estimated ability of the Township to finance annual construction after all other road needs of a more or less fixed or predetermined nature have been allowed for.

BACKGROUND

The local road system of the Township contains 159.2 miles of which 37.4 miles were opened by plans of subdivision and have not been included in this study. The balance of 121.8 miles are the original road allowances and other major local roads which are included in the study.

Traffic volumes on these roads are influenced not only by the population growth in the Township but also by the growth of the Metropolitan Area to the south whose residents use Township roads in travelling to and from recreational facilities in, and north of, the Township.

Future development of the Township is guided by the Official Plan and this document contemplates that future residential development of an urban nature will be located primarily in the First Concession north to Elgin Mills Road and in the Second Concession north to Highway No. 7. Suburban residential development is anticipated in the Maple, Kleinburg and Woodbridge areas. Industrial development is expected to be confined largely to the Maple and C.N.R. Yard areas. The past trend to the establishment of recreational facilities in Vaughan, serving mainly the residents of Metropolitan Toronto is expected to continue.

All of this development will increase travel on the Township road system and the increase is expected to be greater than the Provincial average over the next twenty years.

THE NEEDS STUDY

The study undertaken to assess the need for improvements to the local road system involved the taking of an inventory of the present system, the accumulation of data on Road Use

ond the Appraisol of the information so obtained in order to determine the location and cost of needed improvements.

The road system was divided into 122 sections for ease of reference and so that each section would comprise o logical project if improvement proved to be necessary. The inventory then consisted of obtaining the physicol meosurements of the geometry of the existing road ond noting the locotion of traffic generotors and other information which, when tabulated oa field doto sheets, gives o reasonably complete picture of oll locol foctors offecting the road. Field data sheets for all bridges and roilwoy crossings showing similar information were olso prepared.

Present road use was measured by traffic counts at each intersection. At more important locotions the counts were made with outomatic traffic recorders over 48 hours or 7 doys as conditions warranted. At all other locations traffic counts were obtoined monuolly at the same time os nearby automatic counts so that o proper correlation could be established. These counts were processed to obtain the 1961 A.A.D.T. (Annual Average Doily Traffic) for each end af each road section. The estimated 1971 A.A.D.T. was obtained by use of an appropriate expansion factor.

The 1961 A.A.D.T. was combined with information on the location of dwellings, commerciol enterprises, places of public ossembly, mail routes, milk routes and school bus routes to obtoin o Service Roting for each road section. These ratings, when compored with each other, give o measure of the relative importance of each road section in the overoll system.

To appraise the system, each road section was compared with the desirable design standard for its volume of traffic os recommended by the Department of Highways, Ontorio. Points were assigned for each element of geometry ond condition ond o point total called the Condition Roting calculoted for each section. The Condition Ratings ore such that the most sotisfactory section receives the highest roting.

Each road section, bridge ond railway crossing is classed as satisfactory, toleroble or deficient based on its condition and the traffic it carried in 1961. The deficient compaments of the road system moke up the 1961 backlog of needed improvements. When appropriate traffic expansion factors were applied, higher design standords were indicated in many coses. These higher design standards were opplied to determine the additionol deficiencies which would likely orise in the period from 1962 to 1971.

As the first step in determining how many of the deficiencies could be overcome by 1971, it was necessory to estimote the cost of making all needed improvements. This was done by preparing estimates of the cost of each needed improvement.

The totol cost of the ten yeor needs is estimoted to be $ 6,579,100. 00 mode up of $ 5,094,100. 00 for existing needs ond $ 1,485,000. 00 for needs which wi ll orise in the period 1962 to 1971. (See Figure 2-4)

THE FINANCIAL PLAN

In order to determine the extent to which needs may be met year by year, it was necessory to examine the financiol capobility of the Township.

Costs of a more or less fixed noture, such os debenture poyments, maintenance and administration costs and the cost of new equipment, and other costs which must be ollowed for, such os construction required on roads not included in the study, have oll been estimoted for each year through to 1971. The difference between the annual funds made available for all road purposes and the funds needed to meet these annual requirements is the amount available for the Improvement Program.

In determining funds which could be mode ovoilable for all road purposes, the annual assessment which might prevoil was estimated for each of the years 1962 to 1971 based on estimated growth rates of popolotion ond per copito assessment.

Population was estimated on the bosis of o totol popolotion by 1980 of 55,000 persons os predicted in the droft Officiol Plon of the Metropolitan Toronto Planning Area. The resulting compound onnual growth rate is 6.34% and the 1971 population is estimated at 31,600 persons. Per capita assessment increose has been assumed ot o rate of $ 15. 00 per yeor. Assessments based on these assumptions have been calculoted for each year to 1971 and result in a predicted increase in totol toxoble assessment from 25.4 million dollars in 1962 to 48.2 million dollors in 1971.

The Township is assisted in financing road maintenance and construction by o Deportment of Highways subsidy omounting to 80% of opproved expenditures for bridges ond culverts and 50% for oll other approved expenditures for road purposes. Further outside ossistonce is received from the Grade Crossing Fund and the railway concerned for improvement of roilwoy crossings, and from adjoining municipolities for agreed-upan improvements to boundary roads. These subsidies and outside contributions have been estimoted in order to arrive ot the net cost to the Township of all road expenditures.

The Financiol Plon decided upon provides for the cost of the totol annual expenditures for road purposes to be met out of current funds to be roised by on onnual mill rate of 11.0 mills on the net toxoble assessment and placed in a Road Account to be used for road purposes only. This plon will meet about 65% of the total needs in the 10 year period and if the 11.0 mill rate is continued beyond 1971, all backlog needs should be eliminated by 1976.

The Financiol Plan formulated for the years 1962 to 1971 is shown in Figure 3-11.

THE IMPROVEMENT PROGRAM

Having determined the funds which can be made available each yeor for needed construction projects, it is necessary to choose the specific projects which wi ll be undertaken each year so thot there may be on orderly flow of design, land acquisition and construction.

Since the most urgent projects should be undertoken first, priorities were assigned to each project by the method developed by the Notional Association of County Engineers. Service and Condition rotings were combined in on empiricol formulo such thot o high Service Roting ond a

low Condition Rating combine to give a high Priority Rating.

The Priority Ratings so established, together with pertinent practical considerations of traffic, project scope, continuity of construction, and geographical location, were used to assemble the annual construction programs, within the limitations of the Financial Plan.

The Improvement Program is divided into a Short Range Program extending over the next two years and a Long Range Program which extends over the 10 year study period to 1971. The Short Range Program is developed in detail so that a clear picture is presented of the scheduling of different phases of each project. In the Long Range Program, projects for the years 1964/1965, 1966/1967 and 1968 to 1971 are grouped together and will be the subject of further detailed Short Range Programs.

THE FUTURE

Future right-of-way widths for all principal roads in the Township have been established by the Official Plan. In some instances the Needs Study has revealed a need for wider rights-of-way and it is the intention of the Township to amend the Official Plan to show the right-of-way width established by the study wherever this is in excess of the width presently shown in the Official Plan.

To preserve the value of the study, traffic, land use and condition of the road system will be checked annually and new appraisals will be made and priorities revised to meet changing conditions. The validity of the Financial Plan will be checked by taking note of the actual annual figures for population, assessment and maintenance costs so that trends away from forecasts may be detected and applied to annual construction programs. With each annual review, the Short Range Program and the two succeeding two-year programs will be advanced one year. The program established is intended to be flexible so that it may be adopted to changing conditions.

Each year Council, on recommendation of the Roads Committee, will choose the projects which are to be launched, carried on, or completed as the case may be, the choice of projects will be governed by the desirability of continuing projects already started, by priorities and by relevant practical considerations.

Every five years a complete re-study will be undertaken involving all the data-gathering operations and analyses performed in this study. At this time the Financial Plan and the Long Range Improvement Program will be amended as conditions dictate.

CONCLUSION

A measure of the urgency for a planned program of road improvement is the increased road expenditure which will be necessary for about 15 years to bring the roads up to satisfactory standards. Limitations on available funds make it imperative that expenditures be made where they will give the greatest long-run benefit.

Although Vaughan is one of the first Townships in Ontario to develop a long-range road program, other Townships can be expected to follow, with the encouragement of the Department of Highways.

CHAPTER ONE

BACKGROUND

OVERALL ROAD SYSTEM

The road system in the Township consists of roads under the jurisdiction of three levels of government. Firstly, there are those freeways and major arterial roads which fall within the jurisdiction of the Department of Highways, Ontario. These roads are principally high volume roads which carry the bulk of the traffic through the Township, and only a small percentage of their total traffic has its origin or destination within the Township.

Secondly, there is the system of minor arterial and collector roads which falls under the jurisdiction of the Toronto and York Roads Commission. These are relatively high volume roads which, in general, rank lower in importance in the overall road system than do the provincial highways. However, these secondary highways form important links between municipalities, both within and without the Township, and act essentially as collector roads gathering traffic from the local roads and delivering it either to its destination or to the provincial system.

Thirdly, there are the local roads which fall within the jurisdiction of the Township, whose principal function is to provide access to properties. However, a great many of the local roads within the Township also act as minor collectors, similar to county roads, picking up local traffic and delivering it to the county or provincial system and, in a number of cases, carrying relatively large volumes of through traffic. It is not considered necessary to differentiate between the primarily local rural roads and those which carry a proportion of through traffic. Differences in importance within the Township system are not considered to be sufficiently great as to warrant any further breakdown in classification than the two major groups outlined below.

EXTENT OF LOCAL SYSTEM

The local road system of the Township contains 159.2 miles of road which may be grouped into two major classifications.

Group One is composed primarily of original Township road allowances and given roads together with a few through roads which have been opened by plans of subdivision. The roads in this group are distinguished from those in Group Two in that, in addition to the traffic generated by enterprises and residences along their length, they also carry significant proportion of through traffic or are located in rural areas. The total mileage of this group is 121.8 miles.

Group Two consists primarily of those roads which have been opened by plans of subdivision and which are used almost exclusively by traffic seeking access to the enterprises and residences located on them. These roads total 37.4 miles.

Of these two groups, only those roads contained in Group One were studied and these are shown on Plate 1. With regard to roads in Group Two, it is considered that construction, if and when required, will be brought about by petitions under the Local Improvement Act. The reconstruction of roads in Group One, with the important exceptions noted below, is considered to be a proper charge on the municipality as a whole. It should be noted here that only existing open roads are included in the Needs Study since the method cannot be applied to unopened roads where no use presently exists. It is, however, necessary to provide for the construction of unopened roads and, where this is necessary or desirable, the timing must be estimated.

This has been done for the road between Concessions VII & VIII through Lots 14 and 15 and for the road between Lots 25 and 26 in Concession III and they are included in the program.

Traffic volumes on certain roads in the Township system are greatly affected, not only by the growth being experienced by the Township, but also by the growth of the Metropolitan Area to the south. This is reflected in two ways. Firstly, in the greater-than-average traffic volumes which exist on some north-south roads and, secondly, in the fluctuation of traffic density between summer and winter, owing to the extensive use by residents of the Metropolitan area of summer recreational facilities in, and north of, the Township.

RESIDENTIAL DEVELOPMENT

The Township, owing largely to its location relative to Metropolitan Toronto, has been experiencing relatively rapid growth, and it is anticipated that the growth in the next twenty years will be even more pronounced. Amendment No. 4 to the Official Plan of the Township, which was prepared in co-operation with the Metropolitan Toronto Planning Board, and adopted in 1961, sets out the guiding principles for future development in the Township. Existing land uses are shown on Plate 2 and the land use map which is a part of the Official Plan, is reproduced on Plate 3. The Official Plan contemplates urban residential development in the First Concession as far north as Elgin Mills Road and in the Second Concession, as far north as Highway No. 7. In addition to these urban areas, additional suburban residential growth is expected in the vicinity of Maple, Kleinburg and Woodbridge, and in other areas, rural residential development is anticipated on lots having a minimum area of one acre. Provided that Township policy in the future allows for residential growth at the forecast rate, the population will nearly double by 1971 and more than triple by 1980, with an attendant increase in travel.

INDUSTRIAL DEVELOPMENT

Industrial development is expected to be mainly confined to two areas:

1 the Maple area, and
2 the Canadian National Railways Toronto Terminal Yard area

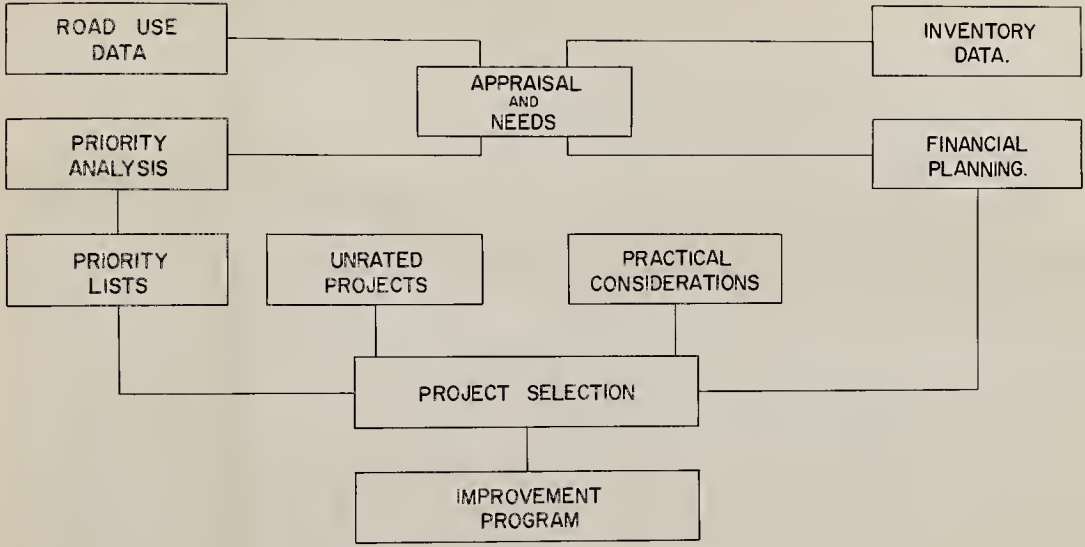
This development will increase traffic volumes to some extent through the whole Township system.

RECREATIONAL DEVELOPMENT

There is a trend to the establishment of recreational facilities in the fringe area of Metropolitan Toronto and Vaughan is no exception, having seen the establishment of such facilities as golf courses, curling clubs, golf driving ranges, private recreational parks and conservation parks. It is expected that this trend will continue and will add to the use of some of the roads in the Township system.

THE FUTURE

In the light of the foregoing factors it is anticipated that the increase in travel in the Township will be considerably above the Provincial average over the next twenty years. It has become apparent to the authorities of the Township that with an annual road expenditure approaching $ 400,000. 00, it is necessary to formulate a comprehensive plan which will enable the Township not only to keep pace with the increase in road use, but also to improve the local roads to accepted standards for the type of service which they are, and will be, required to provide. Such a plan has been developed, based on the findings of the Needs Study and the financial capability of the Township. This plan is to be implemented by the Improvement Program set out in this document.



PROCEDURAL DIAGRAM

FIG: I

TOWNSHIP FIELD DATA SHEET - ROADS

Township of VAUGHAN County of YORK

Road No. (or Name) LANGSTAFF SIDE RD. — BATHURST ST TO DUFFERIN ST

Section No. 10. From 1.40 MILES To 2.80 MILES

Length 1.34 miles Date:

By:

		Notes	Sketch
			2.80 ℄ DUFFERIN ST — JOG IN LANGST SIDE ROAD; 2.70; 2.60; 2.50 STOPE(SHEDS BEHIND); 2.40; 2.30; 2.20 BARN; 2.10; 2.00 24" C.M.P.–29' LONG; .90; .80; .70; .60; .50; .45 ℄ BATHURST ST.; .40
			HYDRO; BELL TELEPHONE; HYDRO; BELL TELEPHONE
Roadway	A.D.T.		
	UTILITIES		
	SIGNS		
	CULVERTS		R
	STRUCTURES		
	SURF. TYPE		
Widths	SURFACE		Gr
	ROAD BED		20'
	FENCED R/W		25
	LEGAL R/W		62'
Culture	LAND USE		Wood; O P E N; Wood; Open
	OTHER		R
	CHURCHES		
	SCHOOLS		
	DWELLINGS		R

TOWNSHIP FIELD DATA SHEET – ROADS

FIG: 2-1

CHAPTER TWO

THE NEEDS STUDY

Inventory provides the basic, descriptive physical measurement of the road system while data on the amount and kind of traffic, give the measure of Road Use. The Appraisal is the culmination of the Needs Study and is the process whereby existing and future improvement needs are determined both as to location and cost.

Neither the Inventory nor Road Use operations attempts to evaluate the quality of the system, but together they provide much of the factual material on which this qualitative measurement, the Appraisal, relies.

INVENTORY

Before setting out to obtain the field data required for the Inventory, it was necessary to divide the road system into sections for purposes of identification. The sections established are generally one and one-quarter miles in length, lying between main intersections. The roads subject to study were thus divided into 122 sections and numbered for reference (See Plate 1).

A field data sheet was then completed for each road section and for each bridge (20 foot span or greater) and railway crossing. A completed field data sheet for roads is shown in Figure 2-1.

The data thus recorded indicate such features as the number of dwellings, schools, churches, commercial enterprises and other traffic generators such as parks, golf clubs, etc., as well as the location of political boundaries and the type of land use. These data also show the geometry of the road such as right-of-way width, road-bed width and width of surface or travelled way. Also shown on the field data sheet are important features such as surface type, intersecting roads, railroad crossings, bridges, culverts, traffic controls and other data which have a bearing on the improvement of the road and will assist in the preparation of preliminary estimates of the cost of improvement, if needed. Additional information is recorded for bridges and railway crossings on seporate data sheets so as to give a reasonably complete picture of the crossing or structure.

These data when completely assembled on the data sheets make up the Inventory of the road system and are used with other information to appraise the system.

ROAD USE

A readily obtainable measure of road use is the present traffic volume. Traffic counts were made at each intersection and at the more important locations, automatic traffic recorders (A.T.R's) were used to obtain either a 48-hour or 7-day count as warranted. At less important locations manual counts were made at the same time as nearby A.T.R. counts so that a proper correlation could be established between the two. Manual counts were classified as to vehicle type but it was not considered necessary to break the total counts down into vehicle classifications. The raw counts were processed by current methods to give the 1961 annual average daily traffic (A.A.D.T.) at each end of each road section. These are shown on Plate 4.

To obtain an estimated 1971 A.A.D.T., which is needed in the appraisal process, expansion factors were applied to roads falling in the general classifications as follows:

	Classification	10-year Expansion Factor.
1	Remote Local Rural Roads	1.3
2	Rural Roads with outside traffic and no population growth	1.5

TOWNSHIP ROAD APPRAISAL SHEET

IDENTIFICATION (LANGSTAFF SIDE ROAD).

1. TOWNSHIP VAUGHAN County/District of YORK
2. SECTION No. 10 From BATHURST STREET To DUFFERIN STREET Length 1.34 Miles

SERVICE CHARACTERISTICS

3. A.D.T. 248 V.P.D (Estimated ☐ Raw Count ☐ Processed ☒)	248	x1=	248
4. Dwellings Per Mile Dependent on This Road For Access	4	x2=	8
5. Commercial Enterprises Per Mile Dependent on This Road For Access	1	x4=	4
6. Places of Public Assembly Dependent on This Road For Access	—	x6=	0
7. Mail Route ☐ School Bus Route ☐ Bulk Milk Route ☐ Other ☐ Total	1	x10=	10
8. SERVICE RATING			270

EXISTING CONDITION

9. TERRAIN 100 % Flat ___ % Rolling ___ % Rocky

10. TRAFFIC PROJECTION

19 61 A.D.T. 248
Growth Factor 18
19 71 A.D.T. 446

11. Right of Way Width 66. Feet

Existing	Design Standard	DEFICIENCY Now	Future (Year)	None
L.T.	L.T.		1969.	
19	20			✓
40	45			✓

12. Surface Type
13. Surface Width
14. Average Safe Speed
15. Surface Life ___ Years

			Point Rating
16. Alignment	Horizontal	(10)	10
	Vertical	(10)	5
17. Surface	Width	(15)	12
	Condition	(10)	8
18. Shoulder Width		(10)	3

		Point Rating
19. Structural Adequacy (Base and Surface)	(20)	15
20. Drainage	(15)	10
21. Maintenance Demand	(10)	5

22. CONDITION RATING 68

23. PRIORITY RATING 2(S.R.+40) 1/4 (100-C.R.) 27

TYPE, TIME AND COST OF IMPROVEMENT

24. TYPE: Complete Reconstruction ☐ Resurface and Minor Widening ☐ Base and Surface ☐
25. Design Class ___ 26. Surface Type ___ 27. Length ___ Miles

	NOW	1-5	6-10
28. Right of Way			
29. Grade and Drain			
30. Base and Surface			
31. Culverts			
32. Engineering			
33. Total			

38. Alternate Stop - Gap improvement TYPE (Describe) ___
39. Total Cost ___ Cost Per Mile ___
40. Estimated to be Good For ___ Yrs.

34. Cost Per Mile ___ Cost Per Veh. Mi ___
35. Bridges ___ 36. R.R.Y.-Xings ___
37. Bridge No's ___ R.R.Y.-Xing No. ___

41. Date: ___
42. By: ___

REMARKS ___

TOWNSHIP ROAD APPRAISAL SHEET

FIG. 2-2

	Classification	10-year Expansion Factor
3	Rural Roads with outside traffic and population growth	1.6
4	Suburban Roads with outside traffic and no population increase	1.8
5	Suburban Roads with outside traffic and population increase	2.1
6	Urban Area Roads with outside traffic and population increase	2.4

It is recognized that there are certain types of traffic which are more important in the overall life of the Township than others. It is for this reason that the field data obtained contains information on the number of dwellings, commercial enterprises, and places of public assembly per mile which depend on each road section for access. Further information was obtained to determine whether each section is a mail route, milk route or school bus route; these are termed "essential routes" since they represent essential services by vehicles which must maintain a fixed schedule. These routes are shown on Plate 4.

In order to compare the impartance of one section with any other in the system, a point rating, called the Service Rating, is calculated for each.

The various types of use are weighted in the approximate ratio of their relative importance. Thus each vehicle is given a factor of 1, each dwelling a factor of 2, and so on with the largest factor, 10, being assigned for an essential route.

The paint total of the various types of use, each multiplied by the appropriate factar, represents the Service Rating af that section of road. Thus this rating is a measure of the relative importance of one road section compared with another when all Service Ratings are determined in the same way; the higher the Service Roting, the greater the relative importance of that section in the Township system.

APPRAISAL

The basic field data gathered for each road section provides the information necessary to appraise its condition relative to other sections in the light of the service it must provide.

Traffic volumes play an important part in determining the Service Rating and they serve their second impartant function in determining the standard of canstruction which should apply. The design standards used are those recommended by the Department of Highways, Ontario for Township rural roads and are based on annual average daily traffic (A.A.D.T.). These standards are generally one class lower than County road standards for the same A.A.D.T. and are shown in Figure 2-3.

By comparing the characteristics of each section with the appropriate design standard and recognizing deficiencies which exist by the assignment of points for each element, sa graduated that a satisfactary condition receives the greatest number and a critically deficient condition the least, a total of points is calculated for each section. This paint total is called the Condition Rating and serves as a measure of the sufficiency of each section as compared to others. The most satisfactory section will have the highest Condition Rating and the least satisfactory section the lowest.

A Condition Rating is calculated for each road section, bridge and railway crossing and used to calculate priorities to assist in scheduling impravements. A typical road Appraisal is shown in Figure 2-2.

DEFICIENCIES

Each road section, bridge and railway crossing may be classed as satisfactory, tolerable or deficient. In the first instance this classification applies ta the 1961 condition. A satisfactory section is one that measures up to the recammended design standard for the volume af traffic it carries. A tolerable section is one which is deficient in same design elements, but not seriously. A deficient section is one which is deficient to more than a predetermined degree in one ar more critical design elements. These critical elements are surface type, surface width and average safe speed. Alsa, a hard surfaced road in need of immediate repaving is classed as a critical deficiency.

The present deficiencies are established in this way and are shawn on Plate 5.

It is also necessary to consider the deficiencies which will arise during the study period and this is done by subjecting satisfactory and tolerable sections to further analysis.

Traffic expansion factors, as set out under Road Use in this Chapter, are applied to the 1961 A.A.D.T. to abtain an estimated 1971 A.A.D.T. If this new traffic volume is such as to warrant a higher design standard, a section which is satisfactory or tolerable in 1961 may become critically deficient by 1971. For such sections, the year when such deficiency will occur is calculated, being the year in which the traffic volume is estimated to increase into the higher design class.

The deficiencies which will occur in the years 1962 to 1971 inclusive are also shown on Plate 5.

In a similar way deficiencies in structures and railway crossings have also been determined and it is now possible to assemble all road sections, structures and railway crossings into three groups:

Group 1 - 1961 Deficiencies (Backlog)

Group 2 - Deficiencies 1962 - 1971

DESIGN STANDARDS FOR TOWNSHIP RURAL ROADS

TOPOGRAPHY – FLAT

DESIGN CLASS (DESIGN YEAR A.D.T.)

ELEMENT	50-100	100-200	200-400	400-1000	1000-3000	PERMISSIBLE-DEVIATION
RIGHT-OF-WAY (FT.)	66	66	86	86	100	
DESIGN SPEED (M.P.H.)	35	40	45	50	55	± 5 M.P.H.
MAX. HORIZ CURVATURE	15°(16.5°)	11°(12.5°)	9°(10°)	7°(7.5°)	5.5°(6°)	SHOWN IN BRACKET
MAX. GRADIENT	8%	6%	6%	6%	5%	+2%
SURFACE WIDTH (FT.)	18	20	20	20	22	± 2 FT. (SEE NOTE 2)
SHOULDER WIDTH (FT.)	4	6	6	8	8	± 2 FT. (SEE NOTE 2)
SURFACE TYPE	GRAVEL OR STONE		LOW COST BITUMINOUS		INTERMEDIATE COST BITUMINOUS.	
BRIDGE ROADWAY WIDTH			28 FEET FOR ALL DESIGN CLASSES.			
BRIDGE DESIGN LOADING			H20-S16 FOR ALL DESIGN CLASSES.			
BRIDGE VERT. CLEARANCE			15 FEET FOR ALL DESIGN CLASSES.			

NOTES: 1 - FOR A.D.T. OF 0-50 USE MINIMUMS FOR 50-100 CLASS WHERE POSSIBLE.

2- MINIMUMS FOR SURFACE AND SHOULDER WIDTHS MAY NOT BE USED TOGETHER.

FIG.: 2-3.

Group 3 - No Deficiencies in Study Period

Group 1 and 2 contain all needs which would go to make up an ideal ten year program with no backlog of needed improvements by the end of 1971. However, to embark on such a program would require the assumption that all required funds would be available when needed. Since this is not the case, it is necessary to determine the cost of needed improvements to complete the Appraisal and to make planned annual expenditures possible.

IMPROVEMENT COSTS

Preliminary estimates of cost based on 20 year design standards and 1961 dollar values, have been prepared for each needed improvement project. Since it is usually more practical to schedule all but the smallest projects over two or more years, the estimates are broken down so that a separate total is obtained for:

1. Preliminary engineering, land acquisition, and utility relocation;

2. Clearing, fencing, structures, grading, drainage and granular base and surface;

3. Hard-surfacing, if required.

Recognizing the possibility of prolonged delays over land negotiations which would seriously affect the scheduling of projects, the policy established for the Improvement Program is that all land acquisition will be by expropriation but with the intention that every effort will be made to settle compensation out of court. The estimates for land acquisition are based on this policy.

NEEDS

The 1961 deficiencies in the road system have a dollar value of $ 5,094,100. 00 of which the Township's share is estimated at $ 2,367,800. 00.

The additional deficiencies which will occur through to 1971 have a dollar value of $ 1,485,000. 00 and the Township's share is $ 715,700. 00.

Thus the total value of the 10 year needs is $ 6,579,100. 00 and the Township's share of these needed improvement projects is $ 3,083,500. 00. These needs are summarized in Figure 2-4.

DESIGN STANDARDS FOR TOWNSHIP RURAL ROADS

TOPOGRAPHY - RDLLING

DESIGN CLASS (OESIGN YEAR A.D.T.)

ELEMENT	5D-IDD	I00-20D	200-400	4DO-1000	IOOD-30DO	PERMISSIBLE-DEVIATION
RIGHT-DF-WAY (FT.)	66	66	86	86	100	
DESIGN SPEED (M.P.H.)	35	35	40	45	50	± 5 M.P.H.
MAX. HDRIZ. CURVATURE	15°(16.5°)	15°(16.5°)	11°(12.5°)	9°(ID°)	7°(7.5°)	SHOWN IN BRACKET
MAX. GRAOIENT	8 %	8%	6%	6%	5%	+2%
SURFACE WIDTH (FT.)	18	2D	20	20	22	± 2 FT. (SEE NOTE 2)
SHOULDER WIDTH(FT.)	4	4	6	6	8	± 2 FT.(SEE NOTE 2)
SURFACE TYPE	GRAVEL DR STONE		LOW CDST BITUMINOUS	INTERMEDIATE COST BITUMINOUS.		
BRIDGE ROAOWAY WIDTH			28 FEET FDR ALL DESIGN CLASSES.			24 FT. MINIMUM.
BRIDGE DESIGN LDAOING			H20-S16 FOR ALL DESIGN CLASSES.			
BRIOGE VERT. CLEARANCE			15 FEET FOR ALL OESIGN CLASSES.			

NDTES: 1 - FOR A.O.T. DF D-5D USE MINIMUMS FOR 5D-IDD CLASS WHERE POSSIBLE.

2 - MINIMUMS FOR SURFACE AND SHDULOER WIDTHS MAY NOT BE USED TOGETHER.

FIG.: 2-3.

DESIGN STANDARDS FOR TOWNSHIP RURAL ROADS

TOPOGRAPHY – ROCKY

ELEMENT	DESIGN CLASS (DESIGN YEAR A.D.T.) 50-100	100-200	200-400	400-1000	1000-3000	PERMISSIBLE DEVIATION
RIGHT-OF-WAY (FT.)	66	66	86	86	88	
DESIGN SPEED (M.P.H.)	30	35	35	40	45	± 5 M.P.H.
MAX. HORIZ. CURVATURE	21°(23°)	15°(16.5°)	15°(16.5°)	11°(12.5°)	9°(10°)	SHOWN IN BRACKET
MAX. GRADIENT	10%	8%	8%	8%	6%	+2%
SURFACE WIDTH (FT.)	18	20	20	20	22	± 2 FT. (SEE NOTE 2)
SHOULDER WIDTH (FT.)	4	4	4	6	8	± 2 FT. (SEE NOTE 2)
SURFACE TYPE	GRAVEL OR STONE		LOW COST BITUMINOUS		INTERMEDIATE COST BITUMINOUS.	
BRIDGE ROADWAY WIDTH			28 FEET FOR ALL DESIGN CLASSES.			
BRIDGE DESIGN LOADING			H20-S16 FOR ALL DESIGN CLASSES.			
BRIDGE VERT. CLEARANCE			15 FEET FOR ALL DESIGN CLASSES.			

NOTES: 1 - FOR A.D.T. OF 0-50 USE MINIMUMS FOR 50-100 CLASS WHERE POSSIBLE.
2 – MINIMUMS FOR SURFACE AND SHOULDER WIDTHS MAY NOT BE USED TOGETHER.

FIG: 2 - 3.

SUMMARY OF TEN-YEAR CONSTRUCTION NEEDS

YEAR	ESTIMATED CONSTRUCTION COST – DOLLARS. ROADS	BRIDGES	R.R.CROSSINGS	TOTAL	ACCUM. TOTAL	ESTIMATED TOWNSHIP SHARE – DOLLARS. ROADS	BRIDGES	R.R.CROSSINGS	TOTAL	ACCUM. TOTAL
1961 BACKLOG	4,643,600	370,500	80,000	5,094,100	5,094,100	2,281,500	70,300	16,000	2,367,800	2,367,800
1962	212,600	—	—	212,600	5,306,700	106,300	—	—	106,300	2,474,100
1963	132,400	—	—	132,400	5,439,100	66,200	—	—	66,200	2,540,300
1964	238,600	—	—	238,600	5,677,700	119,300	—	—	119,300	2,659,600
1965	—	—	—	—	5,677,700	—	—	—	—	2,659,600
1966	—	—	—	—	5,677,700	—	—	—	—	2,659,600
1967	—	—	—	—	5,677,700	—	—	—	—	2,659,600
1968	107,600	—	—	107,600	5,785,300	53,800	—	—	53,800	2,713,400
1969	332,800	—	—	332,800	6,118,100	166,400	—	—	166,400	2,879,800
1970	333,800	—	—	333,800	6,451,900	140,100	—	—	140,100	3,019,900
1971	127,200	—	—	127,200	6,579,100	63,600	—	—	63,600	3,083,500
10 YEAR NEEDS	128,600	370,500	80,000	6,579,100		2,997,200	70,300	16,000	3,083,500	

FIG: 2 - 4.

CHAPTER THREE

THE FINANCIAL PLAN

The Needs Study has fixed the location and cost of needed improvements. The funds which can be made available through a ten-year Financial Plan will determine the extent to which improvements can be made each year and the proportion of the total needs which can be met by 1971.

FIXED COSTS

In order to determine the limit which must be placed on funds for construction to meet improvement needs, it is necessary to examine, first of all, those annual costs which must be met before construction needs can be considered. These costs consist of outstanding debenture debts which are to be retired from the general rate, maintenance and administration costs, the cost of new equipment (and housing) or the cost of replacing existing equipment (and housing), the cost to the general rate, if any, of construction required on urban roads and roads in Police Villages, the cost of any new roads added to the system which will be a charge against the Township as a whole and finally, a small block of uncommitted funds which may be used to meet emergencies which may arise from year to year. The estimated annual expenditures for all purposes other than construction to meet improvement needs are shown in Figure 3-4.

OUTSTANDING DEBENTURE DEBT

Owing to damage to roads and bridges caused by Hurricane Hazel in 1954, there is an outstanding debenture debt as of 1961 of $ 99,328. 14. This debt is to be retired between now and 1966 as follows:

1962	-	$ 19,953. 13
1963	-	$ 19,741. 25
1964	-	$ 19,997. 50
1965	-	$ 19,721. 88
1966	-	$ 19,914. 38

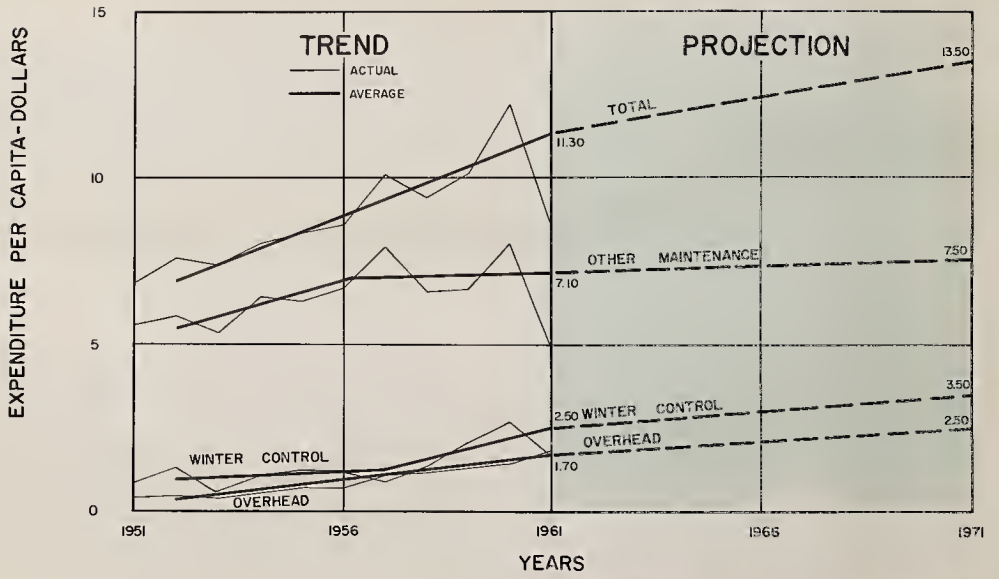
The Department of Highways' subsidy on the construction for which this debt was incurred was paid in the year of construction. Therefore, the full amount of these annual payments must be met from the annual mill rate to be established for all road purposes.

MAINTENANCE AND ADMINISTRATION

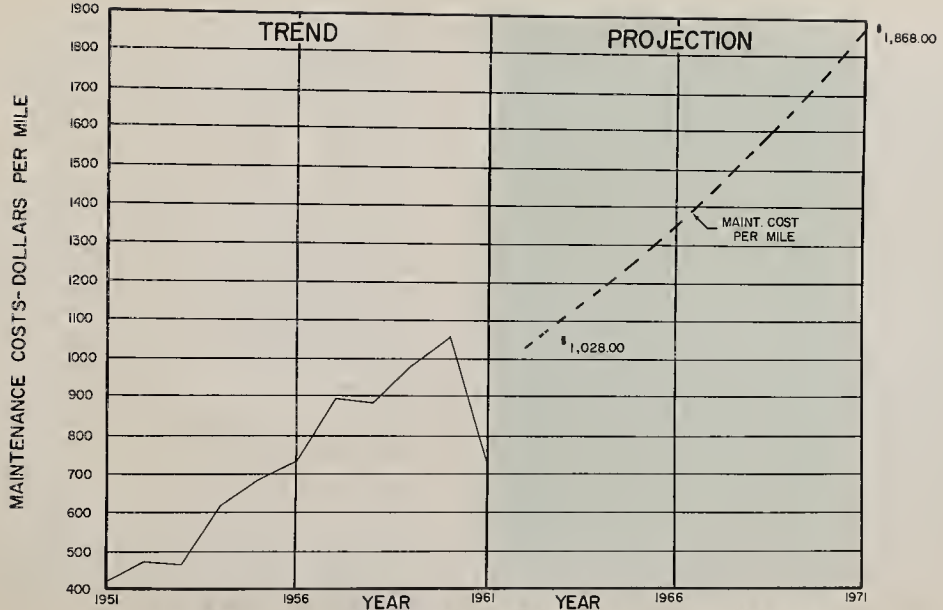
It is difficult to establish any real pattern from previous years' total expenditures other than a general upward trend in total maintenance. However, when per-capita total maintenance is broken down into overhead, winter control and other maintenance, some trends become noticeable. Overhead in particular, shows a relatively uniform rate of increase over the past ten years. Winter control is more variable but with a very pronounced increase each year for the last five years. Other maintenance expenditures vary considerably from year to year but nevertheless an upward trend is evident, though less pronounced since 1957. In forecasting future expenditures for maintenance and administration, projections were made both on a per-capita and on a per-mile basis.

Increasing population is considered to have a direct bearing on maintenance expenditures for two reasons:

1. Increased population means increased road mileage, although in a



PER CAPITA OVERHEAD AND MAINTENANCE EXPENDITURES FIG:3-1



PER MILE OVERHEAD AND MAINTENANCE EXPENDITURES FIG:3 -2

EQUIPMENT INVENTORY AND NEEDS

ITEM	ESTIMATED ANNUAL WORK HRS	YEAR PURCHASED	NET COST	REMARKS	YEAR AND COST OF REPLACEMENT									
					1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
1-POWER GRADER														
ADAMS 350	2,100	1954	23,236	REPLACE WITH HEAVIER MODEL.	—	27,000	—	—	—	—	—	—	27,000	—
GALION T500	2,100	1960	31,318	—	—	—	—	—	27,000	—	—	—	—	—
2-PULL GRADER														
STOCKLAND 230A	300	1956	1,061	REPLACE AFTER 1971.	—	—	—	—	—	—	—	—	—	—
3-TRUCKS														
INTERNATIONAL 184	2,200	1955	5,205	NEW MOTOR 1961 LIGHT WORK.	—	—	—	6,000	—	—	—	—	—	—
CHEVROLET 6403	2,200	1958	5,560	—	—	6,000	—	—	—	—	—	—	6,000	—
FORD 700	2,200	1959	5,287	—	—	—	6,000	—	—	—	—	—	—	6,000
INTERNATIONAL B184	2,200	1960	7,061	—	—	—	—	—	6,000	—	—	—	—	—
INTERNATIONAL 160	2,000	1960	700	1953 MODEL LIGHT WORK.	—	—	6,000	—	—	—	—	—	—	—
4-LOADERS														
HOUGH	2,300	1958	13,133	—	—	—	—	10,000	—	—	—	—	—	—
CASE 540	800	1961	4,850	REPLACE AFTER 1971	—	—	—	—	—	—	—	—	—	—
INTERNATIONAL 300	800	1956	3,742	—	—	—	5,000	—	—	—	—	—	5,000	—
5-LIGHT TRACTORS														
CASE VA14	700	1954	1,916	NO REPLACEMENT	—	—	—	—	—	—	—	—	—	—
FORD 95	700	1957	500	1947 MODEL	1,000	—	—	—	—	2,500	—	—	—	—
6-MISCELLANEOUS														
SPRAMOTOR WEED SPRAYER	—	1948	1,265	—	—	2,000	—	—	—	—	—	—	—	—
STEAM JENNY 3003	—	1955	2,295	—	—	—	—	—	—	2,500	—	—	—	—
WAGNER BACKHOE	—	1957	2,995	FOR INT. 300 LOADER, REPLACE AFTER 1971.	—	—	—	—	—	—	—	—	—	—
7-NEW INVENTORY														
STEAMER	—	—	—	—	2,250	—	—	—	—	—	—	—	—	—
SPRAY PATCHER	—	—	—	—	—	—	—	2,000	—	—	—	—	—	—
TOTAL ESTIMATED ANNUAL NEEDS					3,250	35,000	17,000	18,000	33,000	5,000	—	—	38,000	6,000
TOWNSHIP SHARE (50%)					1,625	17,500	8,500	9,000	16,500	2,500	—	—	19,000	3,000

FIG. 3 - 3

Suburban Township such as Vaughan, increasing population, which is predominantly of an urban nature, has the overall effect of decreasing the total road mileage per capita. Even so, the resulting increase in density per mile puts upward pressure on maintenance expenditures.

2. There is a continuing pressure for higher standards of maintenance from residents, particularly from new arrivals, since most of these came from more highly urbanized areas with generally higher standards of construction and maintenance. Examples of this trend are the increasing use of dust layer and the increase in Winter Control in previous years.

Maintenance costs per mile are expected to increase owing to increased population density and higher standards. Road mileage increase is directly related to population increase and a projection of total road miles has been made on the basis of one new mile of road for each 500 persons of population increase. Looking a better method of allowing for new industrial roads and losses of roads to other jurisdictions, it has been assumed that these two will balance each other. The present total road mileage is 159.2 miles and the 10 year increase is estimated to be 29.1 miles resulting in a total road mileage in 1971 of 188.3 miles.

In forecasting future expenditures required for maintenance and administration, it has been assumed that the per-capita expenditure will continue to rise but at a lesser rate, and that the per-mile expenditure will increase at about the same rate as in the years 1953 to 1960. The forecast made to fit these criteria shows a per-capita expenditure for maintenance and administration of $ 13.50 by 1971, compared to an average of $ 10.32 for the years 1960 and 1961. (See Figures 3-1 and 3-2).

It must be noted that the purpose of this forecast is not to set an annual budget for maintenance and overhead expenditures but only to make an allowance for the purpose of calculating the funds available for construction. The Roads Department will continue a policy of keeping maintenance expenditures as low as possible consistent with the need. Excess funds resulting from good management will be applied to accelerate the improvement program.

EQUIPMENT AND HOUSING

The road equipment now owned by the Township will for the most part require replacement as each item reaches the end of its normal economic life span.

Assuming reasonably full use of equipment, the major classifications will have a normal economic life span approximately as follows:-

1. Graders, bulldozers and other heavy equipment - 7 years
2. Heavy trucks and tractors - 5 years
3. Light trucks (under 4 tons) 3 years
4. Light, seasonal equipment (weed sprayers, steam jennys, etc. - 10 years

These life spans vary somewhat depending on use, maintenance and other factors but, in general, they form a reasonable basis for estimating future needs for new equipment.

When the purchase of a new piece of equipment is considered, it may be that a study of comparative economics will indicate that for certain specialised equipment it is better to rent as needed than to buy. In determining new equipment needs no allowance has been made for the purchase of heavy equipment for construction since it is Township policy to accomplish all major construction by contract.

The 1961 Equipment Inventary is shown in Figure 3-3 together with the estimated replacement year and cost. No provision has been made for adding heavy equipment to the inventary. Some additions other than those allowed for may be necessary, but these should be of a minor nature which will not appreciably affect planned expenditures.

The present equipment garage and workshop was built in 1956 and has adequate facilities for present equipment and should not require expansion until after 1971.

The Township now owns a gravel pit in Lot 16, Concession VII, known as Jacob's Pit. Normally, annual contracts are let for the crushing of the year's requirements of gravel for maintenance. Indications are that the pit will run out in 1964. It is not considered necessary to acquire a new pit to provide for future maintenance requirements since gravel is generally available from commercial pits at competitive prices. When the pit runs out, the trucks now used for hauling gravel will be used for lighter work and this is reflected in the longer life expectancy shown in the Equipment Inventary after 1964.

URBAN ROADS AND POLICE VILLAGES

From time to time, work of a construction nature is required on existing subdivision roads both in the Township proper and in the Police Villages. For the most part, this work is undertaken only on petition of the abutting owners under the Local Improvement Act. The policy in the past has been for the Township to rebuild the granular base and provide adequate drainage with the total cost of surfacing being charged to the abutting owners. The Township's share of the work, i.e., base and drainage, has been eligible for Department of Highways subsidy. Assuming that this policy will be continued, the sum of $ 10,000. 00 per year has been set aside to meet the Township's share of the cost of such petitioned improvements. This will permit approximately one mile of such construction per year. Insofar as possible, the amount of work of this type which is planned in any one year will be limited to the expenditure of these funds.

UNOPENED AND NEW ROADS

A number of road allowances exist which, through disuse or because they have never been open, are classified as unopened roads. During the next ten years, it will became desirable to open two of these. The unopened roads selected for construction are as follows:

1. Road allowances between Concessions VII and VIII through Lots 14 and 15 - approximately one-half mile,
2. Road allowance between Lots 25 and 26 in Concession III - approximately one and one-half miles.

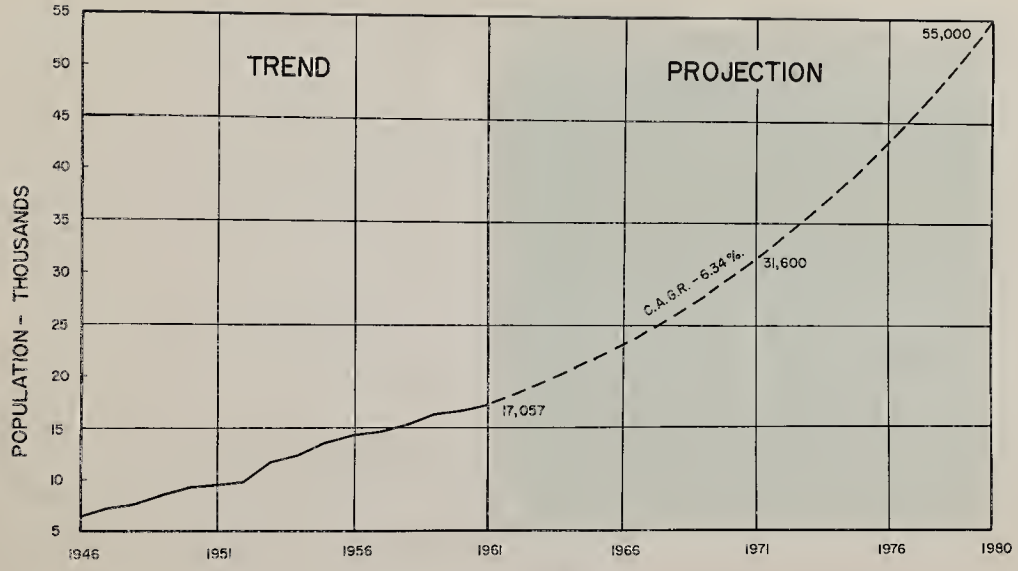
EXPENDITURES REQUIRED ADDITIONAL TO IMPROVEMENT PROGRAM

1962 TO 1971.

YEAR	TAXABLE ASSESSMENT (MILLIONS) TOTAL (1)	NET (2)	TOWNSHIP SHARE OF ESTIMATED EXPENDITURE (THOUSANDS) DEBENTURE PAYMENTS	MAINTENANCE & ADMINISTRATION	NEW EQUIPMENT	URBAN ROADS	TOTAL	LEVY REQUIRED MILLS
1962	25.4	23.4	19.95	98.25	1.63	10.00	129.83	5.55
1963	27.3	25.0	19.74	106.25	17.50	10.00	153.49	6.14
1964	29.3	27.0	20.00	115.40	8.50	10.00	153.90	5.70
1965	31.5	29.0	19.72	124.85	9.00	10.00	163.57	5.64
1966	33.6	31.1	19.92	135.15	16.50	10.00	181.57	5.84
1967	36.3	33.4	–	146.40	2.50	10.00	158.90	4.76
1968	39.0	35.9	–	158.55	—	10.00	168.55	4.70
1969	41.8	38.5	–	171.10	—	10.00	181.10	4.70
1970	44.9	41.3	–	185.25	19.00	10.00	214.25	5.19
1971	48.2	44.4	–	200.50	3.00	10.00	213.50	4.81
TOTALS	357.5	329.0	99.33	1,441.70	77.63	100.00	1,718.66	5.22 AV.

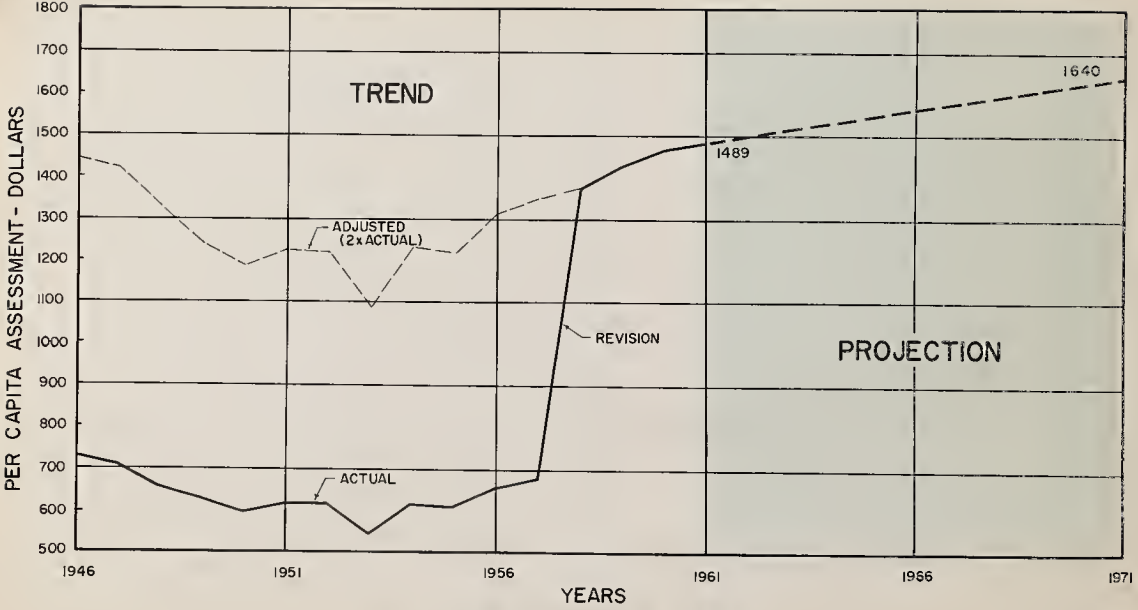
NOTE:- (1) INCLUDES POLICE VILLAGES.
(2) BASE FOR ROAD LEVY.

FIG: 3 -4.



POPULATION

FIG: 3 -5.



PER CAPITA ASSESSMENT

FIG: 3 -6.

To open these roads will require an expenditure of $ 217,500. 00 and construction has been scheduled for 1967 and 1965 respectively as set out in the program.

No provision is made in the program for the expenditure of Township funds to open new roads.

UNCOMMITTED FUNDS

In laying out the financial plan, it is undesirable to plan away the full amount of revenue which may be available each year. If this were done, the plan would become so inflexible as to invite departure from it. Therefore out of the total funds which may be available for construction each year, approximately ten percent (10%) has been set aside and will not be ear-marked for specific projects until the actual program for that year is set. In this way, limited funds will be available within the overall plan to meet emergencies and local needs.

ASSESSMENT

Assessment is a basic factor in the determination of funds available to meet road needs. It is, therefore, necessary to establish an assessment forecast. To assist in this forecast, two major references were made:

1. The trend of total and per-capita assessment in the Township since 1946;
2. The population predicted for Vaughan Township in the draft of " The Official Plan of the Metropolitan Toronto Planning Area – 1959 ".

In the Township, per-capita assessment has been on the increase since 1953 and it is considered that this trend will continue, although the rate of increase over the past eight years is thought to be somewhat higher than that which may be expected over the next ten years. However, the Township is currently pressing a vigorous policy of encouraging new industry to locate in the Township. It is possible, therefore, that the past trend may continue. However, since predicted per-capita assessment will determine total assessment, it is wise in formulating the financial plan to be conservative in this estimate. The forecast is based on a straight line increase in per-capita assessment from 1962 to 1971 at the rate of $ 15. 00 per year.

At this point, it should be noted that in 1958 the Township increased all assessments from 50% to 100% of Provincial Manual values. This doubled the total assessment and, in order to establish the past trend, all assessments prior to 1958 were doubled.

Since a population forecast is vital to the method used in arriving at future assessments, the best information available in a long range prediction was used, namely the draft Official Plan of the Metropolitan Toronto Planning Area, 1959. This plan anticipates that Vaughan Township will have a total population of 55,000 persons by 1980. Starting with the 1961 population of 17,057, gives a compound annual growth rate of 6.34% and a 1971 population of 31,600 persons. The year by year trend and forecast in population is shown in Figure 3-5. Combining the per-capita assessment forecast and the population forecast results in a total assessment in 1971 of $ 51,800,000. 00. The trend and forecast of per-capita and total assessment is shown in Figures 3-6 and 3-7 and a tabulation of population, per-capita and total assessment from 1946 to 1971 is shown in Figures 3-8.

In 1961 an independent forecast of assessments to 1965 was made by the Treasurer's Department in conjunction with a 5 year capital budget forecast. The assessment forecast was based on anticipated industrial, commercial and residential growth and indicates assessments somewhat higher than the forecasts made herein. The difference can be attributed to the attempt made to be conservative in the projection of per-capita assessment for the purpose of the Improvement Program.

SUBSIDIES AND OUTSIDE CONTRIBUTIONS

To determine the total amount of money which must be raised by the Township to accomplish necessary construction, the funds available from other sources must be estimated. The net cost must be raised by taxation within the Township.

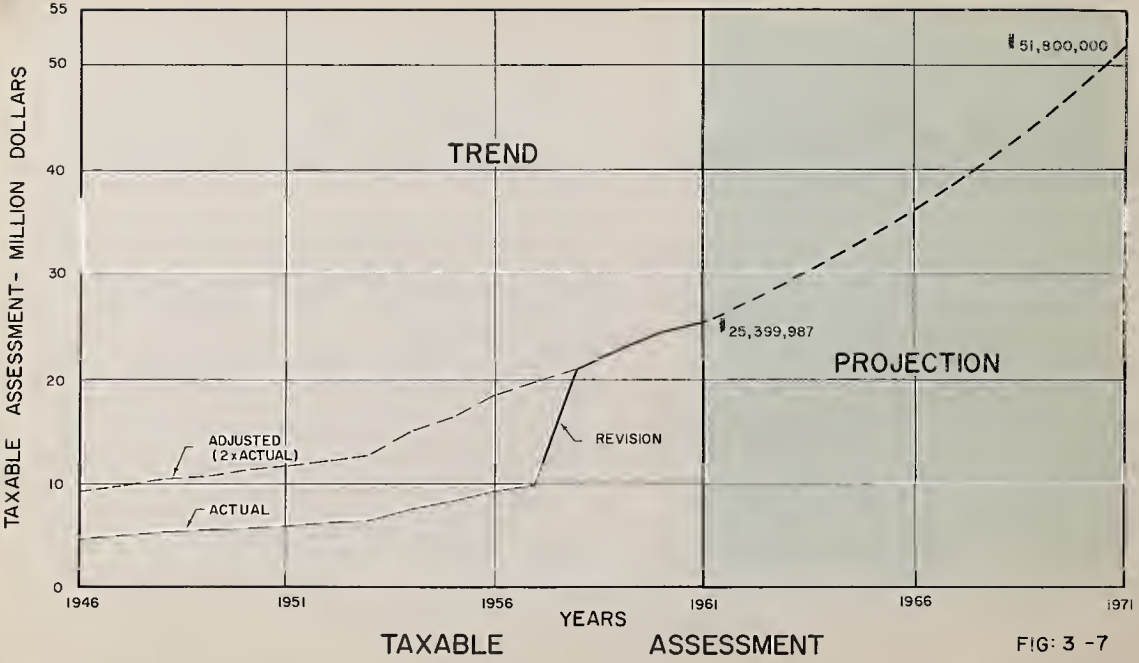
At the present time, expenditures made by the Township for road purposes, when set up in a by-law and approved by the Department of Highways, Ontario, are eligible for provincial subsidies. In general, these subsidies amount to 80% of the approved expenditures for maintenance and construction of bridges and culverts, and 50% of the approved expenditures for any other maintenance and construction.

Railway crossing improvements are eligible for contributions from the Grade Crossing Fund administered by the Board of Transport Commissioners, and from the Railway concerned. These contributions amount to 80% of approved expenditures from the Grade Crossing Fund and 7-1/2% from the Railway concerned. However, the design standards on which these approved expenditures are based are outmoded and unsuitable for present day traffic. It has been the experience in Vaughan that in order to make improvements which are acceptable from a road design point of view, the Township's share will generally exceed the remaining 12-1/2% of the total approved expenditure. The Township's share of crossing improvements is further eligible for normal provincial road subsidy but, in the light of experience the net cost to the Township is estimated at 20% of the estimated total expenditure required.

Where boundary roads are involved, the cost of required construction is usually shared equally with the adjoining municipality under a Boundary Line Agreement. For maintenance purposes, the practice is for each municipality to maintain a designated section amounting to about one-half the common boundary road and cross billings are avoided.

PROGRAM POLICY

The funds required to meet the Township's share of road expenditures are raised within the rate imposed for general purposes. This general purposes rate is generally a fairly small proportion of the total mill rate. Other rates which go to make up the total are the County rate,



TAXABLE ASSESSMENT

FIG: 3 -7

POPULATION AND ASSESSMENT
1946 to 1971.

TREND

YEAR	POPULATION	TAXABLE ASSESSMENT			
		PER CAPITA		TOTAL	
		ACTUAL	ADJUSTED	ACTUAL	ADJUSTED
1946	6,420	724	1,448	4,651,263	9,302,526
1947	7,001	710	1,420	4,971,850	9,943,700
1948	7,785	666	1,332	5,184,727	10,389,454
1949	8,596	621	1,241	5,335,557	10,671,114
1950	9,305	598	1,196	5,565,682	11,131,364
1951	9,587	611	1,221	5,854,250	11,708,500
1952	9,977	610	1,220	8,085,210	12,170,420
1953	11,636	547	1,094	6,365,481	12,730,962
1954	12,359	611	1,222	7,549,441	15,098,882
1955	13,518	605	1,209	8,173,000	16,348,000
1956	14,127	655	1,311	9,257,162	18,514,324
1957	14,728	678	1,357	9,991,603	19,983,206
1958	15,133	1382		20,919,956	
1959	16,033	1422		22,800,631	
1960	16,505	1476		24,359,009	
1961	17,057	1489		25,399,987	

PROJECTION

YEAR	POPULATION	TAXABLE ASSESSMENT	
		PER CAPITA	TOTAL
1962	18,100	1,505	27,297,700
1963	19,300	1,520	29,323,800
1964	20,500	1,535	31,481,300
1985	21,800	1,550	33,799,300
1966	23,200	1,565	36,298,600
1967	24,700	1,580	38,981,800
1968	26,200	1,595	41,848,000
1969	27,900	1,610	44,914,200
1970	29,700	1,625	48,197,500
1971	31,800	1,640	51,750,200
1980	55,000	NO ESTIMATE	NO ESTIMATE

NOTE: ASSESSMENTS SHOWN ARE FOR TAXATION IN FOLLOWING YEAR.

FIG: 3 -8.

FUNDS AVAILABLE FOR IMPROVEMENT PROGRAM AT VARIOUS MILL RATES

YEAR	ACCUMULATED NEEDS (THOUSANDS) TOTAL	ACCUMULATED NEEDS (THOUSANDS) TWP. SHARE	NET TAXABLE ASSESSMENT. (MILLIONS)	TWP. SHARE OF MAINT. ETC. THOUSANDS	MILLS	AVAILABLE FUNDS 7.4 MILL ROAD LEVY FUNDS FOR MILLS	7.4 MILL ROAD LEVY AVAILABLE PROGRAM THOUSANDS	7.4 MILL ROAD LEVY ACCUM. CONST. (TWP. SHARE)	11.0 MILL ROAD LEVY FUNDS FOR MILLS	11.0 MILL ROAD LEVY AVAILABLE PROGRAM THOUSANDS	11.0 MILL ROAD LEVY ACCUM. CONST. (TWP. SHARE)	14.6 MILL ROAD LEVY FUNDS FOR MILLS	14.6 MILL ROAD LEVY AVAILABLE PROGRAM THOUSANDS	14.6 MILL ROAD LEVY ACCUM. CONST. (TWP. SHARE)
1961	5,094.1	2,367.8												
1962	5,306.7	2,474.1	23.4	129.83	5.55	1.85	43.3		5.45	127.6		9.05	211.8	
1963	5,439.1	2,540.3	25.0	153.49	6.14	1.26	31.5	74.8	4.86	121.5	249.1	8.46	211.5	423.3
1964	5,677.7	2,659 6	27.0	153.90	5.70	1.70	45.9	120.7	5.30	143.1	392.1	8.90	240.3	663.6
1965	5,677.7	2,659.6	29.0	163.57	5.64	1.76	51.0	171.7	5.36	155.4	547.8	8.96	259.8	923.4
1966	5,677.7	2,659.6	31.1	181.57	5.84	1.56	48.5	220.2	5.16	160.5	708.1	8.76	272.4	1,195.8
1967	5,677.7	2,659.6	33.4	158.90	4.76	2.64	88.2	308.4	6.24	208.5	916.6	9.84	328.7	1,524.5
1968	5,785.3	2,713.4	35.9	168.55	4.70	2.70	96.9	405.3	6.30	226.4	1,143.0	9.90	355.4	1,879.9
1969	6,118.1	2,879.8	38.5	181.10	4.70	2.70	104.0	509.3	6.30	242.4	1,385.4	9.90	381.2	2,261.1
1970	6,451.9	3,019.9	41.3	214.25	5.19	2.21	91.3	600.6	5.81	240.0	1,625.4	9.41	388.6	2,649.7
1971	6,579.1	3,083.5	44.4	213.50	4.81	2.59	115.0	715.6	6.19	274.9	1,900.3	9.79	434.7	3,084.4

FIG: 3 – 9.

school rates, special Police Village levies and local levies for additional services provided. Taking 1961 as being fairly typical of the relative mill rate imposed for road purposes, general purposes, and all purposes, we see that the total mill rate within the Township fluctuated between 56.2 and 75.5 mills with the predominating residential levy being about 70 mills. The levy for general purposes within this total mill rate was 18.8 mills on residential assessments in areas other than Police Villages. Of the total rate for general purposes, 8.4 mills or about 45% was levied for road purposes.

Over the past three years, i.e., 1959, 1960 and 1961, total Township road expenditures, less payments made on outstanding debentures and after subsidy, have resulted in levies of from 7-1/2 to 9 mills for both construction and maintenance expenses. Of this total, construction expenditures have accounted for from 3 to 5 mills.

It now becomes necessary to make two policy decisions affecting the financial plan: firstly, will the funds required to meet improvement needs be obtained through the sale of debentures, through annual tax levies on a pay-as-you-go basis, or through a combination of these; and secondly, will the plan be based on a fixed annual mill rate or a uniform annual expenditure?

With regard to the first consideration, the issuance of debentures has the advantage that it would be possible to accelerate the Improvement Program in the early years, and thus eliminate a portion of the backlog needs sooner. However, this would result in increasing debenture payments each year, until the first debenture is paid off. The future effect of such a financial burden cannot be accurately estimated. Certainly the Township's borrowing power would be reduced perhaps to the point where it would be impossible to borrow for other needed services which could be financed no other way. It is preferable to devise a program which will eliminate the backlog needs in a reasonable period of time and will call for annual expenditures which can be met each year by an annual levy for road purposes.

With regard to the second consideration, a uniform expenditure each year would result in a decreasing levy for construction since total assessment is rising. However, in order to achieve the same goal by 1971, it would be necessary to begin the program with higher levies. It is desirable to base the construction program on a uniform mill rate, i.e., the same number of mills will be levied each year for road purposes. This will result in each year's program being greater than the previous one, again because of increasing assessment.

Another consideration which entered into the establishment of the program was whether or not it would be desirable to accelerate the construction program in the early years. If a large proportion of the backlog needs were extremely critical, a program of this kind would have been adopted. However, since most deficiencies which exist in the road system do not require urgent improvement, acceleration is unnecessary.

THE FINANCIAL PLAN

With the information now available, it is possible to estimate all road expenditures, other than construction, which must be made year by year throughout the study period. The total assessment which will prevail in the Township each year throughout the study period has also been estimated.

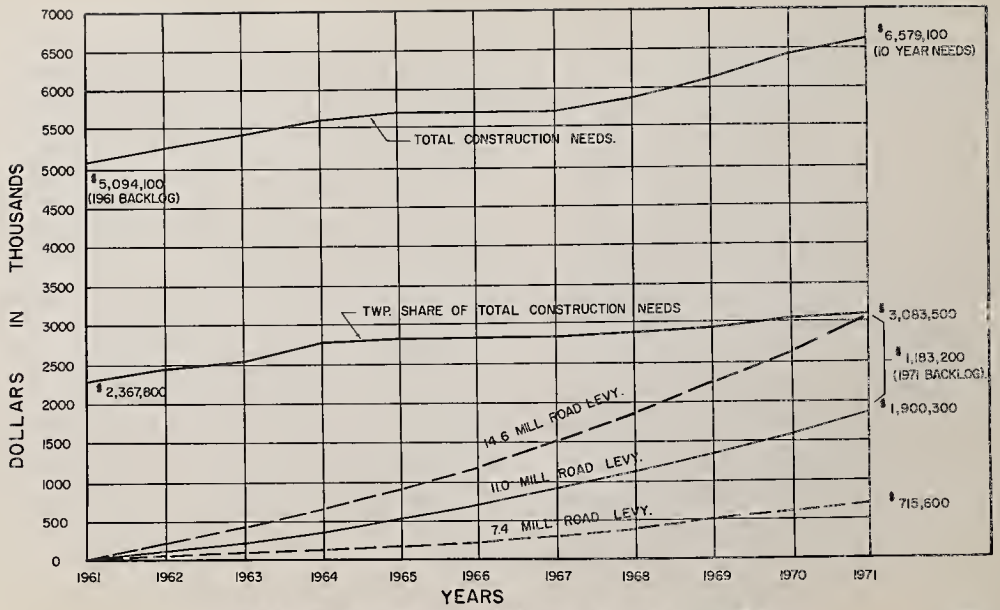
One other factor must be considered and this is the position of the Police Villages of Maple and Thornhill relative to levies for road purposes. These Villages are not charged with the general Township rate for roads since they finance road expenditures through special Police Village rates. The total assessment forecast includes the assessment within these Villages and, in order to determine the net annual assessment on which the general rate for road purposes may be levied, it is necessary to make a reduction. This reduction is estimated, so as to yield a conservative estimate of available funds, at 8% of the total taxable assessment in each year. This is close to the actual 1961 ratio and is liberal since it is unlikely that taxable assessment within the Police Villages will increase in the same proportion as total Township assessment.

It is now possible to determine the mill rate which must be levied each year for road purposes other than construction. Having adopted the plan of a uniform mill rate for total road expenditures, the funds available for construction each year may be calculated for any given total mill rate for road purposes. Figure 3-9 shows the monies available for construction at various mill rates for the years 1962 to 1971 and Figure 3-10 shows the accumulated construction needs and available revenue at various mill rates over the study period.

From these data, it will be seen that an average of 9.38 mills would need to be raised for construction each year in order to completely eliminate all backlog needs by 1971, not only those which exists today, but also those which will arise during the study period. While this would be the ideal plan, the annual cost is high and would result in an average annual levy of about 14.6 mills for all road purposes. At the other end of the scale a bare minimum plan would be to just keep pace with the occurrence of new deficiencies which, for the 10-year period, amount to an average of $ 148,500.00 per year. This minimum plan would require an average of 2.18 mills annually for construction and 7.4 mills for all road purposes.

These two extremes are shown on Figure 3-10 together with the annual rate of 11 mills selected for the plan. The 11 mill rate for all road purposes will yield an average of 5.78 mills annually for construction and about $ 1,900,000.00 over the 10-year period to meet the Township's share of needed improvements. The annual allocation of funds for various road purposes, based on the estimated revenue from the 11 mill levy, is shown in Figure 3-11. Since the Township's share of the 10-year needs is $ 3,083,500.00, the plan will meet about 65% of the total needs in the period. If the 11 mill levy is continued beyond 1971, all backlog needs should be eliminated by 1976.

The goal thus established is a realistic one, the attainment of which will result in the elimination of the backlog deficiencies in the road system in a reasonable period of years without imposing too heavy a burden of taxation.



CONSTRUCTION NEEDS AND AVAILABLE FUNDS

FIG: 3-10

THE FINANCIAL PLAN

CONSTRUCTION YEAR	TAXABLE ASSESSMENT (MILLIONS) TOTAL	NET	ROAD LEVY MILLS	THOUSANDS	TOWNSHIP SHARE OF ESTIMATED EXPENDITURE — THOUSANDS DEBENT. PAYMENT	MAINT. & ADMIN.	NEW EQUIP'T	URBAN ROADS	IMPROVEMENT PROGRAM	ANNUAL TOTAL
1962	25.4	23.4	11.0	257.40	19.95	98.25	1.63	10.00	127.57	251.40
1963	27.3	25.0	11.0	275.00	19.74	106.25	17.50	10.00	121.51	275.00
1964	29.3	27.0	11.0	297.00	20.00	115.40	8.50	10.00	143.10	297.00
1965	31.5	29.0	11.0	319.00	19.72	124.85	9.00	10.00	155.43	319.00
1966	33.8	31.1	11.0	342.10	19.92	135.15	16.50	10.00	160.53	342.10
1967	36.3	33.4	11.0	367.40	—	146.40	2.50	10.00	208.50	367.40
1968	39.0	35.9	11.0	394.90	—	158.55	—	10.00	226.35	394.90
1969	41.8	38.5	11.0	423.50	—	171.10	—	10.00	242.40	423.50
1970	44.9	41.3	11.0	454.30	—	185.25	19.00	10.00	240.05	454.30
1971	48.2	44.4	11.0	488.40	—	200.50	3.00	10.00	274.90	488.40
	357.5	329.0		3,619.00	99.33	1,441.70	77.63	100.00	1,900.34	3,619.00

FIG: 3 - 11.

CHAPTER FOUR

THE IMPROVEMENT PROGRAM

PRIORITY ANALYSIS

Priority analysis is a methodical and important procedure for ranking needed improvement projects in order of relative urgency. It makes the subsequent selection of projects for annual construction programs a simpler, more orderly and more rational process.

The improvement projects which are needed have been determined and it now becomes necessary to apply a criterion to each project, in order to determine where it should fit in the overall program. It is possible to schedule projects according to priorities based on personal judgement, but there are two problems associated with this procedure. The first is that there is too much information for one person to assimilate and keep in his mind, while weighing the need of one project against another, and the second is the difficulty which would be experienced in justifying priorities established in such an informal way, should initial public reaction be unfavourable toward the scheduling of a particular project.

The method of priority analysis which has been adopted is that proposed by the National Association of County Engineers (NACE), with modifications made by the Department of Highways, Ontario. This method involves the interaction of the Service Rating and Condition Rating. These ratings are combined in an empirical formula which was chosen by NACE after practical experiment with several trial formulas, each differing in the relative weight given the two ratings. The formula is such that a road section with a high Service Rating and a low Condition Rating will receive a high Priority Rating. Thus, for each road section and each road structure, a Priority Rating is determined. This provides the basis for setting up the program and, in general, those projects with the highest priority ratings are scheduled earliest in the program.

In many cases a present deficiency receives a lower priority than a section which, while not deficient now, will become deficient at some time during the study period. In such cases a present deficiency cannot be scheduled for improvement by 1971 on the basis of priority alone unless its priority relative to other sections is increased in annual reviews.

This method of assigning priorities cannot be used for the opening of unopened roads or for the construction of new roads. It is necessary to rely on judgement in placing these projects within the program.

For ease of reference all needed improvement projects have been assembled into a priority list which is shown on Plate 6. Plate 5 shows the location and priority rating of needed improvement projects.

The priority ratings assigned to projects must be reviewed annually and revised as relative use and condition change.

SCHEDULING

The assembly of a program requires the processing of the data on needs, financing and priorities with a seasoning of legitimate practical considerations to convert these data to an actual construction timetable. The short-range program provides a detailed listing of projects to be built in the next two years, establishing an orderly flow of surveys, design, right-of-way acquisition, and construction activity. The six-year program extends beyond this to include

TOWNSHIP OF VAUGHAN
LONG RANGE ROAD IMPROVEMENT PROGRAM — 1962 TO 1971

SECTION NO.	LENGTH MILES	PROJECT DESCRIPTION	TYPE OF IMPROVEMENT	TOTAL	COST OF IMPROVEMENT — THOUSANDS.														
					1962			1963			1964 – 1965			1966 – 1967			1968 – 1971		
					ROADS	BRIDGES	R.R. XINGS	ROADS	BRIDGES	R.R XINGS	ROADS	BRIDGES	R.R. XINGS	ROADS	BRIDGES	R.R. XINGS	ROADS	BRIDGES	R.R. XINGS
	12·3	SEC. Nos. 25, 68, 34, 61 & PARTS OF 62, 83, 31, 32	SEE DETAIL FIG 4-2 TWO-YEAR PROGRAM	523·3	249·0	6·1	8·5	245·6	14·1	—									
34	1·3	KLEINBURG SIDEROAD CON. VIII	COMPLETE REBUILD	23·2							23·2								
61	1·4	BATNURST ST. LOTS 21–25	COMPLETE REBUILD	24·9							24·9								
24	1·4	ELDER MILLS RD. BR. N°11 CON. VIII	COMPLETE REBUILD REPLACE BRIDGE	118·5							64·4	54·1							
65	1·4	DUFFERIN ST. LOTS 6–10	COMPLETE REBUILD	93·8							89·4	4·4							
66	1·4	DUFFERIN ST. LOTS 11–15	COMPLETE REBUILD	85·1							80·9	4·2							
67	1·4	DUFFERIN ST. LOTS 16–20	COMPLETE REBUILD	118·8							114·7	4·1							
42	1·4	WHITE SCHOOLHOUSE BR. N°4 CON. VIII.	COMPLETE REBUILD REPLACE BRIDGE	129·8							83·8	46·0							
29	1·3	25 SIDEROAD R.R. 4 CON. III.	COMPLETE REBUILD INCL. R.R. XING	177·0							59·2	2·5	6·5	108·8					
71	1·4	JANE ST. LOTS 1–5	COMPLETE REBUILD	134·2										127·4	6·8				
18	1·4	CARRVILLE RO. CON II	COMPLETE REBUILD	132·4										125·9	6·5				
115	1·4	WELDRICK RO. CON. I.	COMPLETE REBUILD	126·6										107·1	19·5				
107	1·5	20 SIDEROAD R.R. N° 9 CON. IX	COMPLETE REBUILD INCL. R.R. XING	122·9										115·3	1·1	6·5			
87A	0·5	SEVENTH CON. LOTS 14–15	COMPLETE REBUILD	47·0										46·0	1·0				
94	1·4	EIGHTH CON. LOTS 26-30	COMPLETE REBUILD	86·8										79·9	6·9				
	30·9															SEE	SHEET 2		
			SUB TOTALS	1944 3	249·0	6·1	8·5	245·6	14·1	—	540·5	115·3	6·5	710·4	41·8	6·5			
			TOTAL COST		263,600			259,700			662,300			758,700					
			TOWNSHIP SHARE		127,400			125,600			294,500			364,800					

FIG. 4 – 1 SHEET 1 OF 2

TOWNSHIP OF VAUGHAN
LONG RANGE ROAD IMPROVEMENT PROGRAM — 1962 TO 1971

SECTION NO.	LENGTH MILES	PROJECT DESCRIPTION	TYPE OF IMPROVEMENT	COST OF IMPROVEMENT — THOUSANDS																
				TOTAL	1962			1963			1964 — 1965			1966 — 1967			1968 — 1971		
					ROADS	BRIDGES	RR XINGS	ROADS	BRIDGES	RR XINGS	ROADS	BRIDGES	RR XINGS	ROADS	BRIDGES	RR XINGS	ROADS	BRIDGES	RR XINGS
	30·9	(FROM SHEET 1)		1,944·3	249·0	6·1	8·5	245·6	14·1	—	540·5	115·3	6·5	710·4	41·8	6·5			
14 112	1·5	PINEGROVE RD. BR. N° 15 CONEDDY RD. BR. N° 14	COMPLETE REBUILD REPLACE BRIDGES	227·0													133·8	93·2	—
93	2·3	NINTH CON. LOTS 10 - 16	COMPLETE REBUILD	163·0													156·0	7·0	—
114	1·4	ARNOLD AVE. CON. I.	COMPLETE REBUILD	166·2													150·9	15·3	—
11	—	BRIDGE N° 18 LOTS 10-11 CON. III.	REPLACE	20·0													—	20·0	—
15, 16 109	3·3	10 SIDEROAD BR. N° 13 CON. VIII, IX & RR. N° 14	COMPLETE REBUILD INCL. RR. XING & BRIDGE	280·0													220·0	44·0	16·0
62, 63	2·8	BATHURST ST. LOTS 26-35	COMPLETE REBUILD	208·8													201·6	7·2	—
9	1·4	LANGSTAFF RD CON. I	COMPLETE REBUILD	145·0													140·6	4·4	—
85, 86 87, 88	5·0	SEVENTH CON. LOTS 1 - 20	COMPLETE REBUILD (SURFACE-LOTS 6-9)	298·8													289·6	9·2	—
32, 33	2·9	KLEINBURG S.R. CONS. VI, VII	COMPLETE REBUILD	175·0													167·8	7·2	—
96	1·4	LITTLE EIGHTH CON LOTS 1 - 5	COMPLETE REBUILD	105·4													99·8	5·6	—
38	1·4	30 SIDEROAD RR. N° 5 CON. IV	COMPLETE REBUILD INCL. R.R. XING	103·6													93·5	2·1	8·0
53, 54 55	4·4	NORTH TOWN LINE BR N°3 CONS. VII, VIII, IX	COMPLETE REBUILD REPLACE BRIDGE	320·4													250·7	69·7	—
44, 45	1·6	30 SIDEROAD RR. N° 11 CONS. X, XI	COMPLETE REBUILD INCL. R.R. XING	93·3													83·6	3·2	6·5
	0·3																		
			SUB-TOTALS		249·0	6·1	8·5	245·6	14·1	—	540·5	115·3	6·5	710·4	41·8	6·5	1967·9	288·1	30·5
			TOTAL COST	42508	263·6			259·7			662·3			758·7			2306·5		
			TOWNSHIP SHARE	1,900·3	127·4			125·6			294·5			364·8			988·0		

TOWNSHIP SHARE OF TEN-YEAR IMPROVEMENTS $ 1,900,300

FIG. 4 - 1 (SHEET 2 OF 2)

TOWNSHIP OF VAUGHAN
TWO-YEAR ROAD IMPROVEMENT PROGRAM :- 1962-1963.

SECTION NO.	LENGTH MILES	PROJECT DESCRIPTION	TYPE OF IMPROVEMENT	COST OF IMPROVEMENT — THOUSANDS. TOTAL	1962 PRE ENGRG.	1962 R/W	1962 DRAIN STRUCT.	1962 BASE	1962 SURF	1962 TOTAL	1963 PRE ENGRG.	1963 R/W	1963 DRAIN STRUCT.	1963 BASE	1963 SURF.	1963 TOTAL	1964 - (TENTATIVE) PRE ENGRG	1964 R/W	1964 DRAIN STRUCT.	1964 BASE	1964 SURF	1964 TOTAL	CARRY-OVER TOTAL
PTS. 82 83, 31, 32	1·0	INTERSECTION TESTON S.R. & 6th CON.	COMPLETE REBUILD	65·0	0·3	16·8	3·2	44·7	—	65·0													
25	1·6	ELDER MILLS RD. HWY. N°7 TO 10th CON.	COMPLETE REBUILD INCL. R.R. XING.	124·3	0·6	30·6	2·9	90·2	—	124·3													
68	1·4	DUFFERIN ST. MAPLE RD. TO LOT 24	STOPGAP SURFACE	14·7	—	—	—	9·5	5·2	14·7													
34	1·3	KLEINBURG S.R. KLEINBURG TO 8th CON.	COMPLETE REBUILD	117·6	0·4	26·5	—	—	—	26·9	—	—	3·3	64·2	—	67·5	—	—	—	—	23·2	23·2	—
61	1·4	BATHURST ST. LOTS 21-25	COMPLETE REBUILD	159·2	0·5	32·2	—	—	—	32·7	—	17·6	10·8	73·2	—	101·6	—	—	—	—	24·9	24·9	—
24	1·4	ELDER MILLS RD. HWY. N° 27 TO COUNTY RD. N° 7	COMPLETE REBUILD INCL. BR. N° 11	140·0							0·5	21·0	—	—	—	21·5	—	—	54·1	64·4	—	118·5	—
65	1·4	DUFFERIN ST. LOTS 6-10	COMPLETE REBUILD	132·0							0·4	37·8	—	—	—	38·2	—	—	4·4	65·4	—	69·8	24·0
66	1·4	DUFFERIN ST. LOTS 11-15	COMPLETE REBUILD	116·0							0·4	30·5	—	—	—	30·9	—	—	4·2	66·1	—	70·3	14·8
67	1·4	DUFFERIN ST. LOTS 16-20	COMPLETE REBUILD	118·8													0·4	18·3	—	—	—	18·7	100·1
	12·3																						
			SUB-TOTAL		1·8	106·1	6·1	144·4	5·2	263·6	1·3	106·9	14·1	137·4	—	259·7	0·4	18·3	62·7	195·9	48·1	325·4	
		TOTAL ANNUAL COST	TOWNSHIP SHARE		263,600			127,400			259,700			125,600			325,400			143,900			

FIG: 4-2.

other projects which can be accomplished within the fromework of the 10-year financial plan. These projects are listed by opproximate year of construction only. The long-range program includes all projects which can be undertoken in the 10-year study period.

The study so far has yielded a quantitative measure of road needs derived from the Needs Study, the rate of expenditure has been settled upon through the Financial Plan, and the relative urgency of needed projects has been established by the assignment of priority rotings.

There are, however, other projects which must be considered for which no priority can be assigned by the method used. Projects of this nature have been determined from a practical assessment of the road system in the Township and these projects are shown at the head of the list of needed projects.

Another matter which must be considered is the passibility of stop-gap improvements. In some cases it may be possible to postpone major expenditures through the improvement of a road which is deficient in only one or, at the most, two characteristics, to a standard somewhat below the twenty-year design. A good example of this is the provision of a temporary low-cost bituminous surface on a road critically deficient only because of its surface type. Such a road could be deficient in other characteristics which are not serious enough to be critical but which would require land acquisition, grading and base widening to meet a twenty-year design standard. Where such stop-gap improvements are possible, these are shown in the list of needed improvement projects.

It is now necessary to take the list of projects rated in order of their priorities, and to determine what the construction year should be for each project which can be scheduled in the long-range program. In order to do this, a number of practical considerations must be taken into account:

1. The achievement of a balance of work, year by year, both as to type and to location within the Township;
2. Desirable continuity of construction on sections of several miles in length which cannot be scheduled as one project;
3. Relative urgency of projects for which no priority rating can be established;
4. Traffic considerations; for instance, it would be unwise to schedule construction on a section which would be required to take traffic from other sections under construction;
5. A practical project scope; for instance, it may be desirable to build a low priority bridge in connection with the construction of a high priority road section on which it is located.

The blending of relative priorities and the practical considerations involved in each section made it possible to schedule the work year by year.

LONG RANGE PROGRAM

The long-range program extends over the ten-year study period. The total content of the program is determined by the financial plan which permits the elimination of about two-thirds of the backlog needs, amounting to a dollar value of some four and one-quarter million dollars, by the end of 1971. This does not mean that most of the present backlog of needed improvement projects will be built by the end of the ten-year program, because, during the program, new deficiencies will arise which will have higher priority than many of the projects in the current backlog. Therefore, it is necessary to consider all the deficiencies which exist now or will arise in the ten-year period, in making up the long-range program. This program, while nearly equalling the present backlog in dollar value will actually contain projects not now on the deficiency list. The long-range program (see Figure 4-1) is chosen from these projects and the projects are listed by year of construction. The last four years (1968 to 1971, inclusive) are bulked together and no attempt made to assign a construction year at this stage. This will be done later in the program as part of the annual and general reviews. The projects proposed for construction in the two preceding program periods (1964/1965 and 1966/1967) are also grouped leaving the opportunity to choose the annual projects at a time closer to the actual construction year. The first two years' programs are set out by their year of construction and these projects are the subject of a detailed breakdown for the short-range program.

SHORT RANGE PROGRAM

In setting up the short range program, the various aspects of construction must be considered, i.e., pre-engineering, land acquisition, grading and drainage, structures and surface. All of these phases of a project cannot normally be accomplished in one construction year and, therefore, the annual programs provide for a continuous flow of preparation and construction over more than one year, where necessary. In those cases where other authorities are involved, consideration has been given to allowing time for proper co-ordination. The detailed breakdown of the short-range program (1962 and 1963) is shown in Figure 4-2.

1971 BACKLOG

The projects proposed for construction by 1971 are listed in the long-range program and this leaves a number of needed projects which will be the subject of further study as the program advances. These projects are listed in Figure 4-3, along with their estimated construction cost. It will be noted that the total dollar value of needed improvement projects at the end of 1971 is about two and one-quarter million dollars. A comparison with the value of the present needs of five million dollars, shows the substantial progress to be accomplished under the long-range program.

TOWNSHIP OF VAUGHAN

1971 BACKLOG OF NEEDED IMPROVEMENTS

PRIORITY Nº	SECTION Nº	YEAR DEFICIENT	DESCRIPTION LOT	CON	NAME	IMPROVEMENT COST
1.	RAILWAY CROSSINGS					1040,800
	11	1961	10/11	III	XING Nº 2	6,000
	49	"	35	IV	6	4,500
	101	"	27	IX/X	10	6,500
	104	"	33	X/XI	12	6,500
	105	"	34	XI	13	4,500
2	BRIDGES	1961				
67	59	"	14	II	BR. Nº 21	40,000
33	43	"	30	IX	6	24,000
33	111	"	20/21	VIII	7	20,000
		"				
3.	ROADS	1961				
61	60	"	16 - 20	I/II	BATHURST	134,400
53	59	"	11 - 15	I/II	"	143,000
46	111	"	20/21	VIII		55,800
45	110	"	18/19	VII/VIII		14,600
41	92	"	3 - 5	VII/VIII		56,400
39	40	"	30/31	VI		85,600
34	13	"	10/11	VI		81,400
34	26	"	15/16	X		42,600
33	79	"	6 - 10	V/VI		100,000
33	108	"	16 - 20	IX		83,800
32	78	"	1 - 5	V/VI		130,800
						4040,800

PRIORITY Nº	SECTION Nº	YEAR DEFICIENT	DESCRIPTION LOT	CON	NAME	IMPROVEMENT COST
						1040,800
25	99	1961	16 - 20	IX/X		85,000
23	68		21 - 25	II/III	OUFFERIN	117,000
20	31		25/26	V		35,000
18	95		31 - 34	VII/VIII		65,600
37	72	1962	6 - 10	IV/V	JANE	106,400
37	73		10 - 15	IV/V	"	106,200
29	27	1964	50/51	I	ELGIN MILLS	131,200
29	80		11 - 15	V/VI		107,400
30	82	1968	21 - 25	V/VI		64,600
33	81	1969	16 - 20	V/VI		111,000
28	17		40/41	I	CARRVILLE	122,800
27	10		10/11	II	LANGSTAFF	99,000
37	69	1970	26 - 30	II/III	OUFFERIN	119,000
33	76		26 - 30	IV/V	JANE	107,600
35	101	1971	26 - 30	IX/X		127,200
			1971 BACKLOG			$2545,800

FIG. 4-3

CHAPTER FIVE

THE FUTURE

COUNTY ROADS

In 1960 the Department of Highways, Ontario published their " Recommendations Respecting Desirable County Road Systems in the Province of Ontario " . This document sets out six criteria to be used as guides in determining desirable county roads.

The Needs Study has revealed that several township roads, which are not in urban areas, meet one or more of these criteria. These roads are as follows:

1 Bathurst Street, from Highway No. 7 to Elgin Mills Road;
2 Dufferin Street, from Highway No. 7 to Elgin Mills Road;
3 Jane Street, from Steeles Avenue to Highway No. 7;
4 Main Street, from Steeles Avenue to Lots 10/11;
5 Concession VI/VII, from Highway No. 7 to Pine Grove.

In addition to these roads, estimated traffic increases will result in total volumes in excess of the criterion of 400 vehicles per day on several other road sections within the next few years.

It is the intention of the Township to seek to have roads which meet county road criteria assumed by the Toronto and York Roads Commission.

These roads are generally high on the priority list and have been scheduled for improvement as conditions dictate. Funds freed by the assumption of any of these roads by the Toronto and York Roads Commission will be used to accelerate the program.

OFFICIAL PLAN

The Official Plan of the Township establishes future right-of-way widths for all roadways on original road allowances. In many cases the results of the Needs Study conflict with these planned widths. Since the design widths established by this study are based on recommended design standards and traffic projections, it is the intention to amend the Official Plan wherever the Needs Study indicates a wider future right-of-way than the Official Plan. In those cases where the Official Plan indicates a wider right-of-way than this study, an amendment will not be necessary since, in the main, these wider rights-of-way occur on the roads which are extensions of Metropoliton Toronto arteries and the recommended width in the Offical Plan derives from the rights-of-way established in Metro.

A tabulation showing the planned right-of-way widths established by the Official Plan and those resulting from this study, is shown in Figure 5-1. The recommended right-of-way widths, being a combination of both sources, are shown on Plate 7.

ANNUAL REVIEW

In order to preserve the value of the study and to ensure that annual construction projects are chosen on the basis of the best possible information, it will be necessary to carry out an annual review of the assembled data.

RIGHT — OF — WAY — WIDTHS.

SECTION	LOCATION		COMMON	WIDTHS			
NO.	CONC.	LOT	NAME	EXISTING	OFFICIAL PLAN	NEEDS	RECOMMENDED
9	I	35-36	LANGSTAFF S.R.	66'	86'	100'	100'
10	II	10-11	LANGSTAFF S.R.	66'	86'	86'	86'
13	VI	10-11		66'	86'	86'	86'
14	VIII	10-11	PINEGROVE RD.	66'	86'	86'	86'
15	VIII	10-11		66'	86'	86'	86'
16	IX	10-11		66'	66'	86'	86'
17	I	40-41	CARRVILLE RD.	66'	86'	100'	100'
18	II	15-16	CARRVILLE RD.	66'	86'	86'	86'
24	VIII	15-16	ELDER MILLS	66'	86'	86'	86'
25	IX	15-16	ELDER MILLS	66'	66'	86'	86'
26	X	15-16		66'	66'	86'	86'
27	I	50-51	ELGIN MILLS	66'	86'	100'	100'
31	V	25-26		66'	86'	86'	86'
32	VI	25-26		66'	86'	86'	86'
33	VII	25-26		66'	86'	86'	86'
34	VIII	25-26	KLEINBURG S.R.	66'	86'	86'	86'
38	IV	30-31	GAMBLE S.R.	66'	66'	86'	86'
40	VI	30-31		66'	66'	86'	86'
42	VIII	30-31		66'	66'	86'	86'
44	X	30-31		66'	66'	86'	86'
45	XI	30-31		66'	66'	86'	86'
53	VII	31-35		66'	66'	86'	86'
54	VIII	35	N TOWN LINE	66'	66'	86'	86'
55	IX	35	N TOWN LINE	66'	66'	86'	86'
59	I-II	11-15	BATHURST ST.	66'	120'	100'	120'
60	I-II	16-20	BATHURST ST.	66'	120'	100'	120'
61	I-II	21-25	BATHURST ST.	66'	120'	100'	120'
62	I-II	26-30	BATHURST ST.	66'	120'	86'	120'
63	I-II	31-35	BATHURST ST.	66'	120'	86'	120'
65	II-III	6-10	OUFFERIN ST.	66'	120'	86'	120'
66	II-III	11-15	OUFFERIN ST.	66'	120'	86'	120'
67	II-III	16-20	OUFFERIN ST.	66'	120'	86'	120'

SECTION	LOCATION		COMMON	WIDTHS			
NO.	CONC.	LOT	NAME	EXISTING	OFFICIAL PLAN	NEEDS	RECOMMENDED
68	II-III	21-25	OUFFERIN ST.	66'	86'	86'	86'
69	II-III	26-30	OUFFERIN ST.	66'	86'	86'	86'
71	IV-V	1-5	5th LINE	66'	120'	100'	120'
72	IV-V	6-10	5th LINE	66'	86'	86'	86'
73	IV-V	11-15	5th LINE	86'	86'	86'	86'
76	IV-V	26-30	5th LINE	66'	86'	86'	86'
78	V-VI	1-5	6th LINE	66'	120'	100'	120'
79	V-VI	6-10	6th LINE	66'	86'	86'	86'
80	V-VI	11-15	6th LINE	66'	86'	86'	86'
81	V-VI	16-20	6th LINE	66'	86'	86'	86'
82	V-VI	21-25	6th LINE	66'	86'	86'	86'
85	VI-VII	1-5	7th LINE	66'	120'	86'	120'
86	VI-VII	6-10	7th LINE	66'	120'	86'	120'
87	VI-VII	11-15	7th LINE	66'	120'	86'	120'
88	VI-VII	16-20	7th LINE	66'	120'	86'	120'
92	VII-VIII	1-5		66'	66'	88'	86'
93	VII-VIII	11-15		66'	66'	86'	86'
94	VII-VIII	26-30	8th LINE	66'	66'	86'	86'
95	VII-VIII	31-35	8th LINE	66'	66'	66'	66'
96	VIII	1-5		66'	86'	86'	86'
99	IX-X	16-20	10th LINE	66'	86'	86'	86'
101	IX-X	26-30	10th LINE	66'	86'	86'	86'
107	IX	20-21		66'	66'	86'	86'
108	IX	16-20		66'	66'	86'	86'
109	X	10-11		66'	66'	66'	66'
110	VII-VIII	16-20		66'	66'	66'	66'
111	VIII	20-21		66'	66'	86'	86'
112	VIII	11		66'	66'	86'	86'
114	I	29	ARNOLD AVE.	66'	66'	86'	86'
115	I	43	WELDRICK	66'	66'	86'	86'

FIG: 5 - I .

In order to do this, land use and condition must be checked. Changes in traffic patterns and volumes are to be noted by means of annual traffic counts, both manual and automatic, at key locations. The manual counts will be taken a minimum four times per year over an 8-hour period and these will be carried out by the Roads Department staff with outside assistance, if needed.

The automatic counts should be of 48 hour duration and the Township's Junior Counters may be used. These automatic counts will be taken as often as possible during the year but not less than four times. It is anticipated that D.H.O. standard forms will be made available and all data will be recorded and processed according to standards recognized by the Department.

Locations have been selected for annual traffic counts which will best reflect changes in traffic volumes without imposing too heavy a burden on the Township's staff. These locations are shown on Plate 8.

Changes in land use which will affect the Service Ratings will be noted on the data sheets and all changes in condition whether through construction or lack of repair will be noted as well.

With the information thus obtained, new appraisals will be made as required and priorities revised to suit changing conditions. Also, the review will detect the occurrence of new deficiencies (those not forecast in the initial study) so that they may be incorporated in the program in proper sequence.

Population, assessment and maintenance expenditures each year will be checked against the forecasts which form the basis for the Financial Plan. Any trends away from the forecast will then be applied to the annual programs.

With each annual review the 6 year improvement program will be extended one year so that the detailed program will always include the current year and the following year and four additional years. This will indicate the direction the program is taking and assist in annual project selection.

The re-appraisal and review can be best carried out in the winter months after the traffic counts have been completed and the other data required for adjusting Service and Condition Ratings have been obtained. For the present at least, the re-appraisals will be performed by qualified consultants.

While the two-year program has been carefully assembled, it is not to be regarded as inflexible. The true value of the Needs Study and the Improvement Program lies in adaptability to changing conditions.

ANNUAL PROJECT SELECTION

Each year Council, on recommendation of the Roads Committee, will choose the following year's projects. They will be so chosen that they may be accomplished within the limitations of the Financial Plan. Since small differences in priority are meaningless in the long view, new projects may be selected from three or four years' tentative programs. Other projects to be included will be those started and not yet completed.

New projects selected will be either relatively small ones which can be accomplished in one season or larger projects involving extensive land acquisition, or other time consuming preliminary work. In the latter case, such projects will need to be spread over two or more years and the estimates have been made so that the cost of separate phases is shown. To the extent that these larger projects occur, planning is actually two or three years ahead since it is intended that a project once started, will be successively advanced each year towards completion.

The choice of projects for the following year will be made in the late summer or early fall each year. This will allow sufficient time for carrying out engineering and land surveys before heavy snowfalls which would hinder these operations and will permit land to be acquired for new projects in the early spring so that contracts for construction may be started in the early summer and completed before freeze-up.

RE-STUDY

Every five years during the Improvement Program a complete re-study is to be undertaken. This will involve all the data gathering operations and analyses performed in the initial study.

This will be the time to revise the Financial Plan as needed and to work out a new Improvement Program based on the needs and available funds as they appear at that time.

Since deficiencies will have been reviewed each year there should be no drastic change in the overall list of needed improvements. However, if the complete traffic counts indicate that forecasts have been in error to a degree which will change the design class, then new deficiencies may come to light while others may not arise as predicted.

The revised Financial Plan may differ appreciably from the original and this will produce changes in the overall Improvement Program both as to annual content and final objective.

THE ROAD RATE

Up until 1961, the levy for road purposes has been included in the overall rate for general purposes. If actual road expenditures in a year were above or below the budget amount, the difference has been charged or credited to general funds.

For the year 1962 and thereafter, the rate required for road purposes, set at 11 mills for the Improvement program, will be itemized separately on the tax bills and the funds raised by this levy will be put into a separate road account and used solely for road maintenance and construction. The road account will then carry a debit or credit balance at each year end which will be applied to the succeeding year's program.

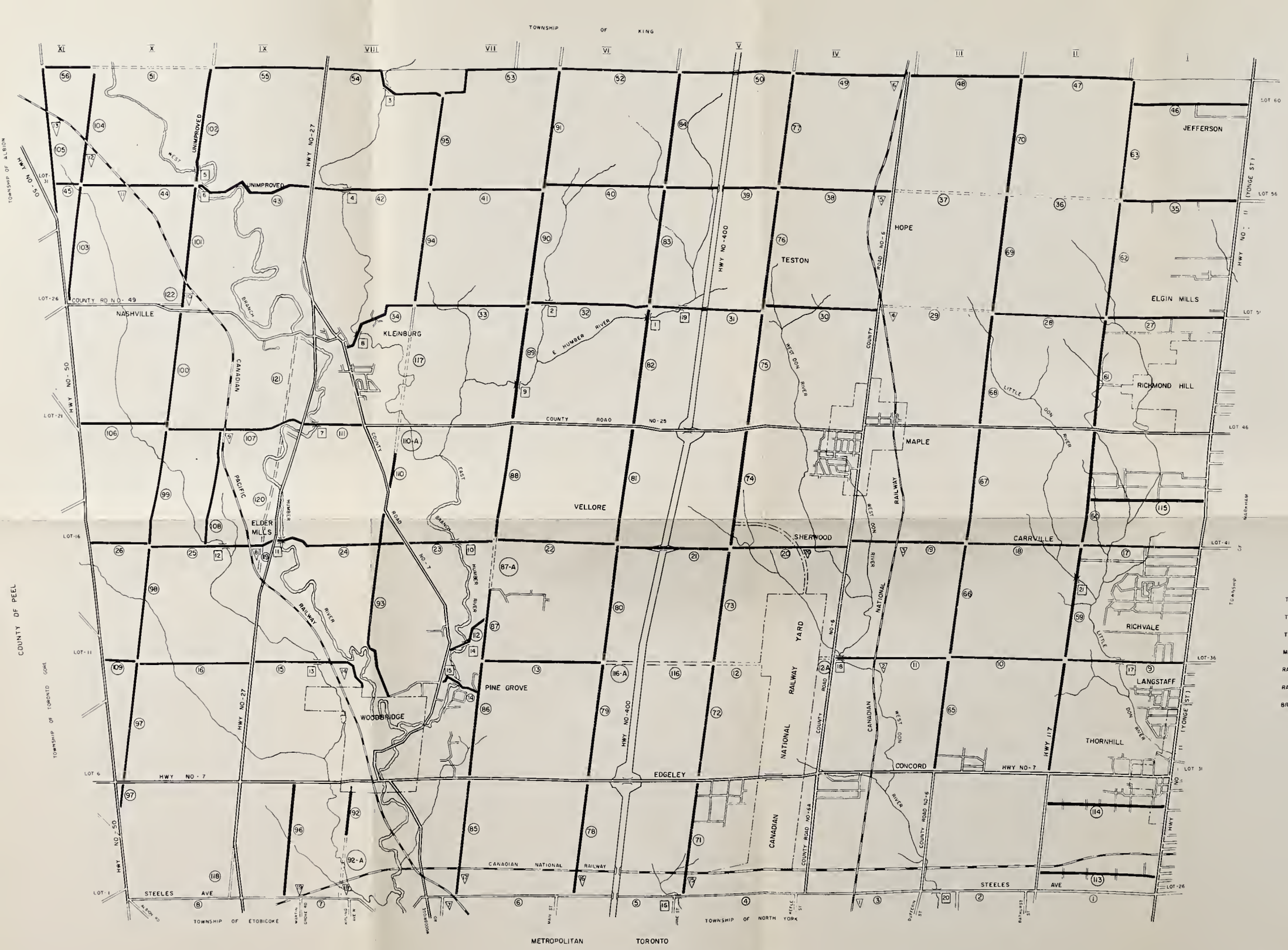
CONCLUSION

The Program developed to meet the need for improvement of the road system will necessitate increased expenditures for roads for about 15 years. This in itself is a measure of the urgency for embarking on the planned program of improvement.

The benefit of the program may not be apparent for several years because of the great

volume of needs and the relatively limited funds which can be used for construction in the early years of the program. The limitation on funds makes it imperative that they be spent in accordance with a long range plan so that the greatest benefit may be derived.

Vaughan is one of the first Townships in Ontario to develop a long range plan for road improvement. Its value, already partially apparent, is such that other townships can be expected to follow Vaughan's example with the encouragement of the Department of Highways, Ontario.



LEGEND

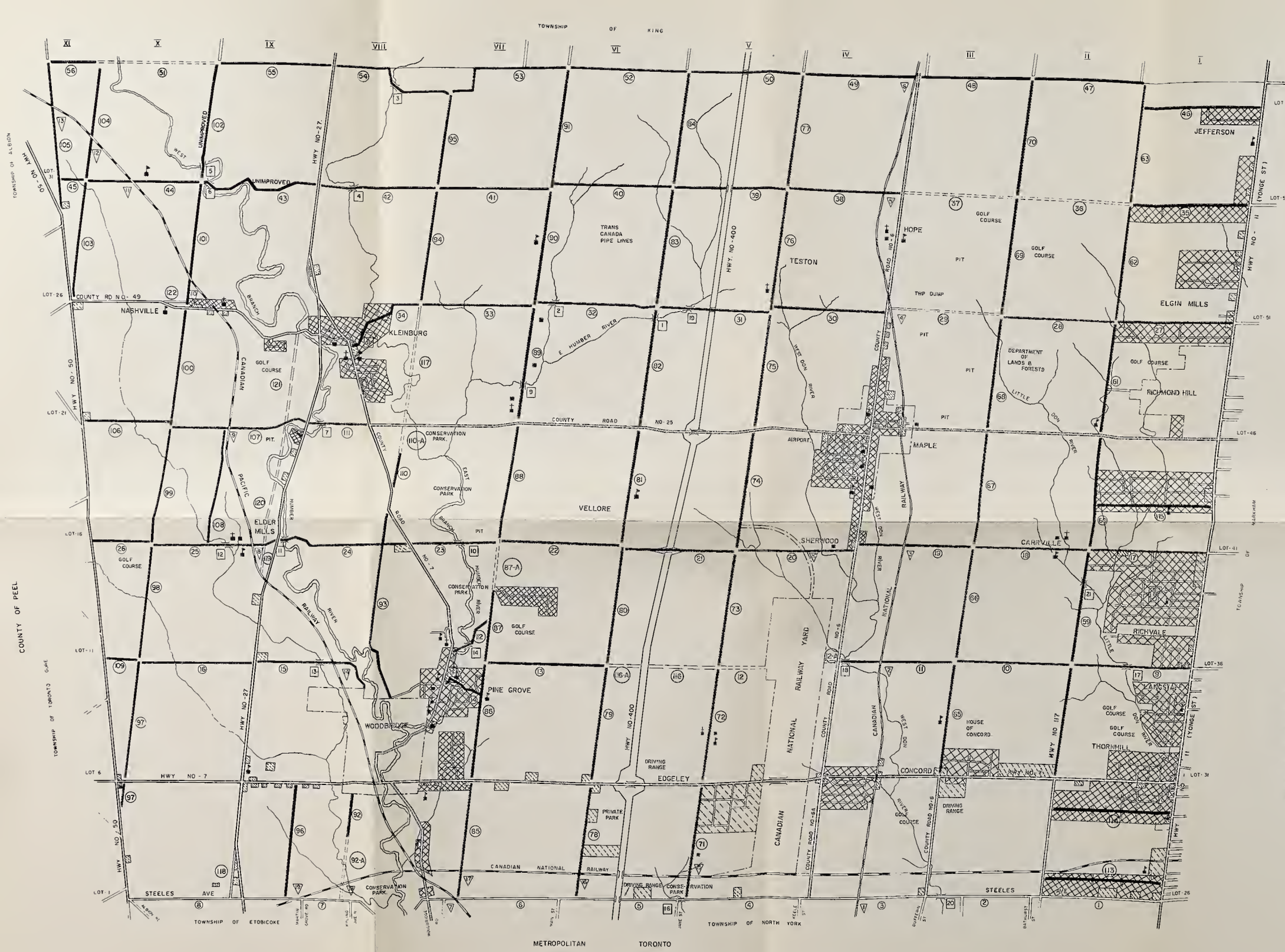
- TWP ROADS INCLUDED IN STUDY (KEY NO)
- TWP ROADS NOT INCLUDED IN STUDY
- TWP ROADS NOT OPENED (R/W EXISTS)
- MAJOR ROADS (UNDER OTHER JURISDICTIONS)
- RAILWAY CROSSINGS (KEY NO)
- RAILWAYS
- BRIDGES (KEY NO)

1000 0 1000 2000 3000 4000 5000 6000
SCALE IN FEET

TOWNSHIP OF VAUGHAN ROAD NEEDS STUDY

ROAD SYSTEM

PLATE 1



TOWNSHIP OF VAUGHAN ROAD NEEDS STUDY

EXISTING LAND USES - 1961

PLATE 2

GENERAL LAND USE

SCHEDULE "A" TO AMENDMENT NO 4 TO
THE OFFICIAL PLAN OF THE
VAUGHAN PLANNING AREA

LEGEND

- BOUNDARY OF PLANNING AREA
- RESIDENTIAL AREA
- INDUSTRIAL AREA
- RURAL AREA

TOWNSHIP OF KING

TOWNSHIP OF KING

TOWNSHIP OF ALBION

TOWNSHIP OF GORE

TOWNSHIP OF TORONTO

CON XI · CON X · CON IX · CON VIII · CON VII · CON VI · CON V · CON IV · CON III · CON II · CON I

JEFFERSON

NASHVILLE

HIGHWAY NO 49

HUMBER RIVER

EAST BRANCH

PURPLEVILLE

KLEINBURG

HOPE

TESTON

ELGIN MILLS

TOWN OF RICHMOND HILL

MARKHAM

NO. 400

VELLORE

HUMBER RIVER

ELDER MILLS

NO. 27

HIGHWAY NO. 50

PINE GROVE

VILLAGE OF WOODBRIDGE

HIGHWAY NO. 7

EDGELEY

CONCORD

CARRVILLE

HIGHWAY NO. 48

LANGSTAFF

POLICE VILLAGE OF THORNHILL

TOWNSHIP OF VAUGHAN

WEST DUFFERIN CR.

BLACK CREEK

PROPOSED C.N. TORONTO BY-PASS

CLAIREVILLE

STEELES (PROPOSED)

TOWNSHIP OF ETOBICOKE

TOWNSHIP OF NORTH YORK

FREQUENCY OF WIND DIRECTION

SCALE IN FEET

2000 0 2000 4000 6000 8000 10000

NOTE: THIS SCHEDULE FORMS PART OF AMENDMENT NO 4 TO THE OFFICIAL PLAN OF THE VAUGHAN PLANNING AREA AND MUST BE READ IN CONJUNCTION WITH THE WRITTEN TEXT

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D. J. W. LITTLE

Drawing No.	60-311
Project No.	284
Drawn by	AC
Checked	D.J.W.L.
Date	3 OCT 1960

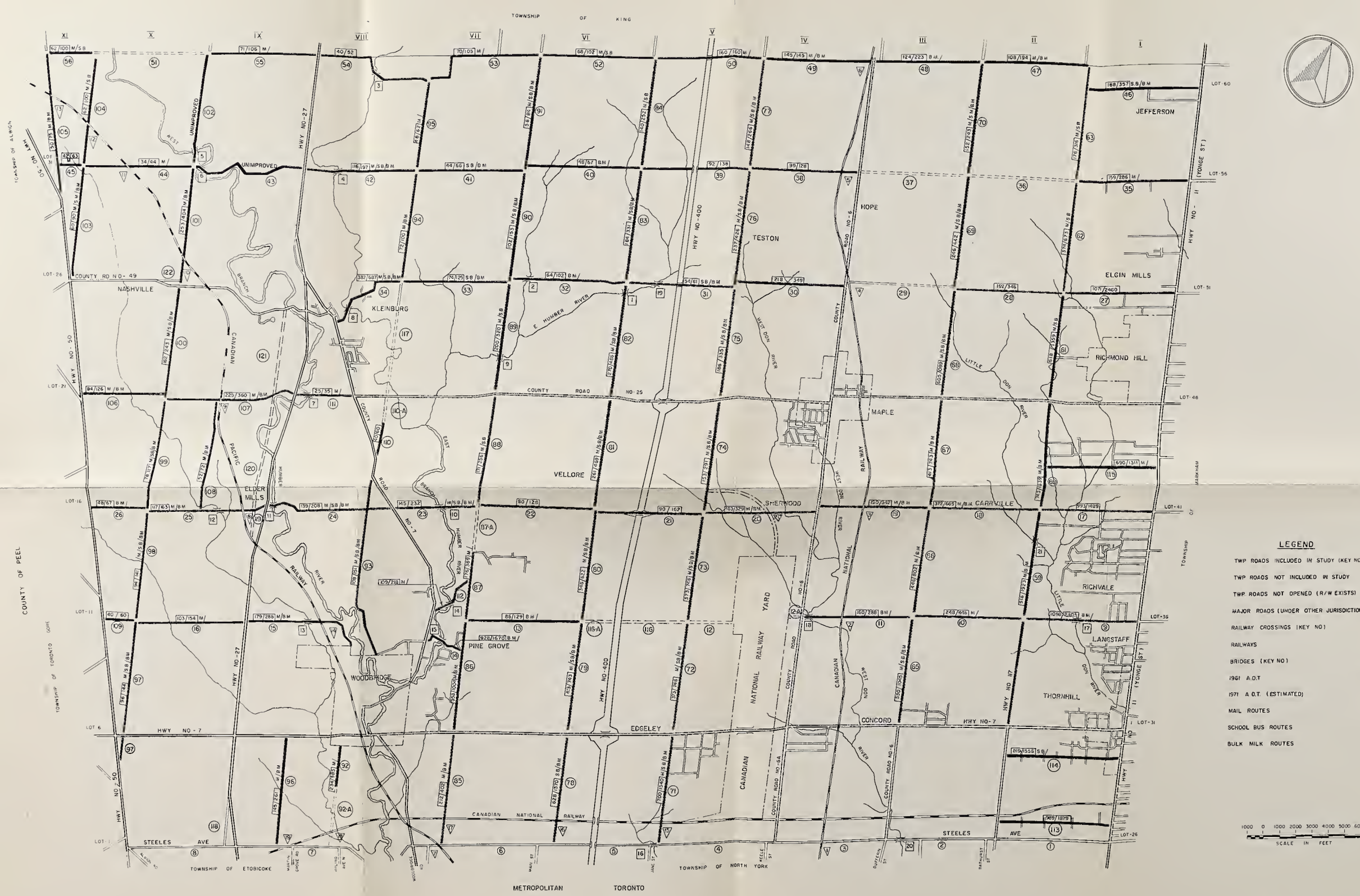
SCHEDULE "A" TO AMENDMENT NO. 4 TO THE OFFICIAL PLAN OF THE VAUGHAN PLANNING AREA
GENERAL LAND USE

SCALE 1" = 2000'

MUNICIPAL PLANNING CONSULTANTS CO LTD

64 ST CLAIR AVE E, TORONTO 7 ONTARIO WA 4-7334

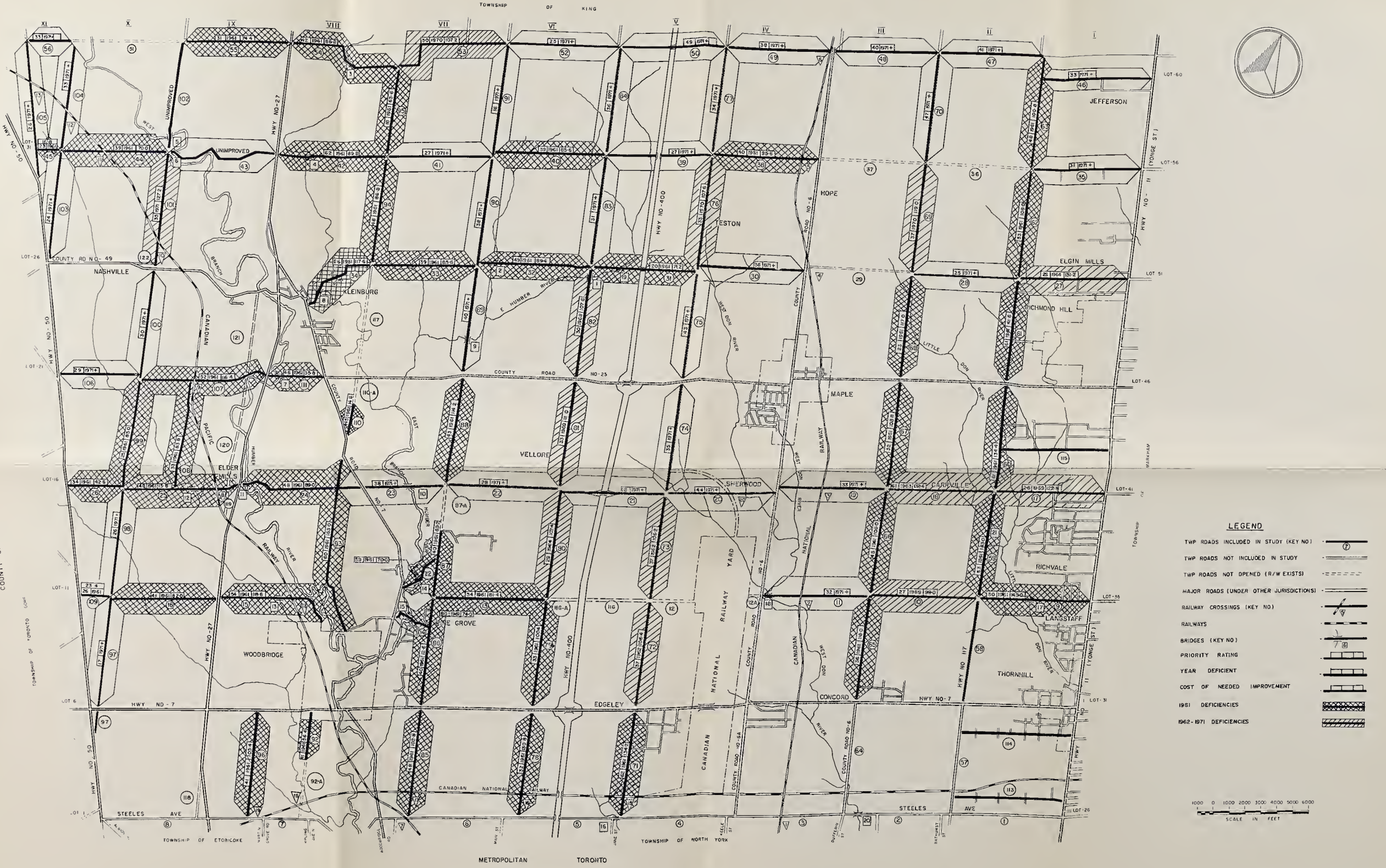
PLATE 3



TOWNSHIP OF VAUGHAN ROAD NEEDS STUDY

TRAFFIC VOLUMES AND ESSENTIAL ROUTES

PLATE 4



LEGEND

- TWP ROADS INCLUDED IN STUDY (KEY NO)
- TWP ROADS NOT INCLUDED IN STUDY
- TWP ROADS NOT OPENED (R/W EXISTS)
- MAJOR ROADS (UNDER OTHER JURISDICTIONS)
- RAILWAY CROSSINGS (KEY NO)
- RAILWAYS
- BRIDGES (KEY NO)
- PRIORITY RATING
- YEAR DEFICIENT
- COST OF NEEDED IMPROVEMENT
- 1981 DEFICIENCIES
- 1962-1971 DEFICIENCIES

1000 0 1000 2000 3000 4000 5000 6000
SCALE IN FEET

TOWNSHIP OF VAUGHAN ROAD NEEDS STUDY

NEEDED IMPROVEMENTS

PLATE 5

NEEDED IMPROVEMENTS - PRIORITY LIST

PRIORITY RATING	SECTION NUMBER	LENGTH MILES	1961 A.A.D.T.	PROJECT DESCRIPTION	CRITICAL DEFICIENCIES			COST OF NEEDED IMPROVEMENTS - THOUSANDS						STOP GAP CONSTRUCTION	
					SURFACE TYPE	SURFACE WIDTH	SAFE SPEED	PRE-ENGINEERING	RIGHT-OF-WAY	DRAINAGE STRUCTURES	BASE	SURFACE	TOTAL	DESCRIPTION	COST
1	NEEDS	WITHOUT	PRIORITY	RATING											
(a)	UNOPENED	ROADS		LOT / CON / COMMON NAME											
	29	1·3		25/26 / 3				0·7	49·8	2·5	104·0	13·5	170·5		
	87A	0·5		14/15 / 6/7				0·2	13·8	1·0	26·0	7·0	47·0		
												TOTAL	217·5		
(b)	RAILWAY	CROSSINGS													
				LOT / CON / COMMON NAME	VISIBILITY										
	11		160	10/11 / 3 / LANGSTAFF S.R.	X								6·0		
	29		150	25/26 / 3	X								6·5		
	38		99	30/31 / 4	X	X							8·0		
	49		145	35 / 4 / NORTH TOWN LINE	X								4·5		
	25		117	15/16 / 9 / ELDER MILLS S.R.	X	X							8·5		
	107		225	20/21 / 8	X		X						6·5		
	101		253	27 / 8/10	X								6·5		
	44		34	30/31 / 10	X	X							6·5		
	104		62	34 / 10/11	X								6·5		
	105		50	34 / 11 / WEST TOWN LINE	X								4·5		
	15		179	10/11 / 8		X							16·0		
												TOTAL	80·0		
2	1961	NEEDS													
(a)	BRIDGES			LOT / CON / BRIDGE NO / SAFE LOAD											
71	14		928	10 / 7 / 15		X							38·0		
67	59		916	18 / 2 / 21		X							40·0		
66	15		179	10/11 / 8 / 13	X	X							40·0		
59	112		109	11 / 7 / 14	X	X							45·0		
57	11		160	10/11 / 3 / 18		X							20·0		
51	24		139	18 / 8 / 11		X							51·0		
48	42		116	30/31 / 8 / 4	X	X							40·0		
38	54		40	35 / 8 / 3		X							52·0		
33	43			30 / 9 / 6		X							24·0		
33	111		25	20/21 / 8 / 7		X							20·0		
												TOTAL	370·5		
(b)	ROADS														
80	14	0·7	928	9/10 / 8 / PINEGROVE RD	X	X	X	0·3	14·8	10·2	36·1	12·6	74·0		
66	34	1·3	382	24-26 / 8 / KLEINBURG S.R.		X		0·4	26·5	3·3	64·2	23·2	117·6		
62	42	1·4	116	30/31 / 8		X		0·5	20·9	6·0	62·4	NIL	89·8		
61	60	1·4	745	16-20 / 1/2 / BATHURST ST.	X			0·6	31·9	5·0	71·9	25·0	134·4	TEMP. D.ST.	15·6
61	61	1·4	618	21-25 / 1/2 / BATHURST ST.	X			0·5	49·8	10·8	73·2	24·9	159·2	TEMP. D.ST.	15·6
60	93	2·3	108	9-15 / 7/8		X	X	0·7	34·7	7·0	120·6	NIL	163·0		
59	112	0·8	109	11/12 / 7		X	X	0·3	14·9	NIL	47·1	7·7	70·0		
62	71	1·4	700	1 - 5 / 4/5 / JANE ST	X			0·6	31·5	6·8	71·1	24·2	134·2	TEMP. D.ST.	15·2
54	15	1·5	179	10/11 / 8		X		0·6	25·9	1·5	76·5	14·1	118·6		
53	59	1·4	916	11 - 15 / 1/2 / BATHURST ST.	X			0·6	35·1	8·9	73·5	74·9	143·0	TEMP. D.ST.	15·6
53	62	1·4	374	26-30 / 1/2 / BATHURST ST.		X	X	0·4	24·0	3·8	65·1	14·7	108·0		
52	67	1·4	413	16-20 / 2/3 / DUFFERIN ST.	X		X	0·4	32·5	4·1	67·2	14·6	118·8		
52	107	1·5	225	20/21 / 8/9			X	0·6	22·8	1·1	77·3	14·6	116·4		
50	9	1·4	1098	35/36 / 8 / LANGSTAFF S.R.	X			0·6	39·1	4·4	75·4	25·5	145·0	TEMP. D.ST.	16·0
49	32	1·5	64	25/26 / 6			X	0·4	21·2	2·7	65·1	NIL	89·4		
48	24	1·4	139	15/16 / 8 / ELDER MILLS S.R.			X	0·5	21·0	3·1	64·4	NIL	89·0		
48	25	1·6	117	15/16 / 8/9 / ELDER MILLS S.R.			X	0·6	30·6	2·9	81·7	NIL	115·8		
48	63	1·4	176	31-35 / 1/2 / BATHURST ST.			X	0·5	20·6	3·4	62·9	13·4	100·8		
48	85	1·3	212	1 - 5 / 6/7			X	0·5	22·8	1·2	65·7	12·6	102·3		
48	94	1·4	72	28-30 / 7/8			X	0·4	20·6	6·9	58·9	NIL	86·8		
46	111	0·9	25	20/21 / 8			X	0·4	12·2	1·1	42·1	NIL	55·8		
45	66	1·4	446	11 - 15 / 2/3 / DUFFERIN ST.	X			0·4	30·5	4·2	66·1	14·8	116·0	TEMP. D.ST.	15·4
45	110	0·3	40	18/19 / 7/8		X	X	0·2	3·2	0·5	10·7	NIL	14·6		
43	68	1·5	171	16-20 / 6/7		X		0·6	24·7	7·5	81·4	NIL	114·2		
42	54	1·6	40	34/35 / 8		X		0·4	14·9	11·4	60·1	NIL	86·8		
41	16	1·4	103	10/11 / 8		X		0·4	20·5	1·4	59·7	NIL	82·0		
41	92	0·7	234	3 - 5 / 7/8		X		0·3	13·8	3·6	31·6	7·1	56·4		
41	96	1·4	145	1 - 3 / 8		X		0·5	23·8	5·6	62·3	13·2	105·4		
40	38	1·4	99	30/31 / 4		X		0·4	13·4	2·1	66·5	13·2	95·6		
40	86	1·2	558	6 - 10 / 6/7	X			NIL	NIL	NIL	NIL	12·6	12·6		
40	87	1·0	176	11 - 13 / 6/7			X	0·3	14·5	0·5	44·7	9·2	69·2		
							SUB-TOTALS	8·9	712·7	131·0	1905·5	322·1	3085·2		

PRIORITY RATING	SECTION NUMBER	LENGTH MILES	1961 A.A.D.T.	PROJECT DESCRIPTION	CRITICAL DEFICIENCIES			COST OF NEEDED IMPROVEMENTS - THOUSANDS						STOP GAP CONSTRUCTION	
					SURFACE TYPE	SURFACE WIDTH	SAFE SPEED	PRE-ENGINEERING	RIGHT-OF-WAY	DRAINAGE STRUCTURES	BASE	SURFACE	TOTAL	DESCRIPTION	COST
2 (b)	ROADS				SUB-TOTALS		FWD.	13·9	71·2·7	131·0	1905·5	322·1	3085·2		
				LOT / CON / COMMON NAME											
39	33	1·4	74	25/26 / 7		X		0·4	20·5	4·5	60·2	NIL	85·6		
39	40	1·4	48	30/31 / 6		X		0·5	20·9	3·0	61·2	NIL	85·6		
39	44	1·3	34	30/31 / 10		X		0·4	12·0	3·0	54·6	NIL	70·0		
36	65	1·4	550	6 - 10 / 3/5 / DUFFERIN ST.	X			0·4	37·8	4·4	65·4	24·0	132·0	TEMP. D.ST.	15·2
34	13	1·4	86	10/11 / 6		X		0·4	20·3	0·9	59·8	NIL	81·4		
34	26	0·7	48	13/16 / 10		X		0·3	11·0	0·5	30·8	NIL	42·6		
33	79	1·3	413	6 - 10 / 5/6	X			0·4	19·4	3·6	63·0	14·0	100·4	TEMP. D.ST.	14·5
33	108	1·4	52	16-20 / 9		X		0·5	20·6	3·0	59·7	NIL	83·8		
31	55	1·3	71	33 / 6		X		0·4	18·8	1·8	53·4	NIL	74·4		
26	109	0·4	40	10/11 / 10		X		0·2	4·7	1·1	17·4	NIL	23·4		
25	99	1·4	78	16-20 / 9/10		X		0·4	20·4	5·3	58·9	NIL	85·0		
32	78	1·4	628	1 - 5 / 5/6	X			0·6	31·3	3·8	70·9	24·2	130·8	TEMP. D.ST.	15·2
23	68	1·4	605	21-25 / 2/3 / DUFFERIN ST.	X			0·5	24·2	12·1	65·7	14·5	117·0	TEMP. D.ST.	14·7
23	45	0·3	42	30/31 / 11		X		0·2	4·9	0·2	11·5	NIL	16·8		
20	31	1·4	54	33/26 / 8		X		0·4	13·0	1·8	56·0	NIL	71·2		
18	95	1·1	48	31-34 / 7/8		X		0·4	11·1	11·3	42·8	NIL	65·6		
57	114	1·4	819	29 / 1 / ARNOLD AVE	X	X		1·1	14·5	15·3	120·3	15·0	166·2	TEMP. D.ST.	16·0
62	115	1·4	690	43 / 1 / WELDRICK AVE	X	X		0·8	13·9	19·5	77·5	14·5	126·6	TEMP. D.ST.	16·0
							TOTALS	22·2	1032·0	226·1	2934·6	428·7	4643·6		
											TOTAL	NEEDS	1961	5094·1	
3.	1962 - 1971 NEEDS														
(a)	1962														
37	72	1·4	373	6 - 10 / 4/5 / JANE ST	X			0·5	24·0	2·1	65·1	14·7	106·4	TEMP. D.ST.	15·4
37	73	1·4	373	11 - 15 / 4/5 / JANE ST	X			0·3	24·1	2·1	65·0	14·7	106·2	TEMP. D.ST.	15·4
							TOTALS	0·8	48·1	4·2	130·1	29·4	212·6		
(b)	1963														
61	18	1·4	372	15/16 / 2 / CARRVILLE RD	X			0·6	25·8	6·5	84·3	15·2	132·4	TEMP. D.ST.	15·8
(c)	1964														
29	27	1·4	1071	30/31 / 2 / ELGIN MILLS S.R.	X			0·5	38·5	14·4	52·2	25·6	131·2	TEMP. D.ST.	16·0
29	80	1·3	346	11 - 15 / 5/6	X			0·4	23·7	5·3	63·6	14·4	107·4	TEMP. D.ST.	15·0
							TOTALS	0·9	62·2	19·7	115·8	40·0	238·6		
(d)	1965														
	NIL														
(e)	1966														
	NIL														
(f)	1967														
	NIL														
(g)	1968														
30	82	1·3	270	21-25 / 5/6		X		0·5	23·7	3·6	64·6	15·2	107·6	TEMP. D.ST.	15·0
(h)	1969														
33	81	1·4	261	16-20 / 5/6		X		0·4	24·6	3·8	67·2	15·0	111·0	TEMP. D.ST.	15·6
28	17	1·4	993	40-41 / 8 / CARRVILLE RD		X		0·4	36·9	9·9	48·8	26·8	122·8	TEMP. D.ST.	16·0
27	10	1·3	248	10 - 11 / 2 / LANGSTAFF S.R.		X		0·4	20·0	1·2	63·1	14·3	99·0	TEMP. D.ST.	15·0
							TOTALS	1·2	81·5	14·9	179·1	56·1	332·8		
(j)	1970														
50	53	1·5	70	34/35 / 7			X	0·7	22·4	4·5	79·6	NIL	107·2		
37	69	1·4	246	26-30 / 2/3 / DUFFERIN ST.	X			0·6	21·0	1·8	81·1	14·5	119·0	TEMP. D.ST.	15·2
33	76	1·4	237	26-30 / 5/6 / JANE ST.	X			0·5	23·8	3·2	65·6	14·5	107·6	TEMP. D.ST.	15·2
							TOTALS	1·8	67·2	9·5	226·3	29·0	333·8		
(k)	1971														
35	101	1·5	253	23-30 / 9/10		X		0·5	26·2	3·9	81·0	15·6	127·2	TEMP. D.ST.	16·2
											TOTAL	NEEDS	1962-1971	1485·0	
											TOTAL	10 YEAR	NEEDS	6579·1	

PLATE 6

TOWNSHIP OF KING

XI X IX VIII VII VI V IV III II I

HWY NO - 50

TOWNSHIP OF ALBION

COUNTY OF PEEL

TOWNSHIP OF TORONTO GORE

WEST BRANCH CANADIAN PACIFIC RAILWAY

HWY NO - 27

HWY NO - 400

COUNTY ROAD NO - 6

HWY NO - 11 (YONGE ST.)

HWY NO - 50

COUNTY ROAD NO - 49

NASHVILLE

KLEINBURG

E. HUMBER RIVER

TESTON

HOPE

JEFFERSON

ELGIN MILLS

RICHMOND HILL

COUNTY ROAD NO - 25

MAPLE

VELLORE

ELDER MILLS

HUMBER RIVER

COUNTY ROAD NO - 7

EAST BRANCH

WEST DON RIVER

LITTLE DON RIVER

SHERWOOD

CARRVILLE

RICHVALE

PINE GROVE

WOODBRIDGE

NATIONAL RAILWAY YARD

CANADIAN NATIONAL RAILWAY

EDGELEY

CONCORD

THORNHILL

LANGSTAFF

HWY NO - 7

STEELES AVE.

TOWNSHIP OF ETOBICOKE

METROPOLITAN TORONTO.

TOWNSHIP OF NORTH YORK

MARKHAM

LOT-60 LOT-56 LOT-51 LOT-46 LOT-41 LOT-36 LOT-31 LOT-26 LOT-21 LOT-16 LOT-11 LOT-6 LOT-1

LEGEND

- TWP. ROADS INCLUDED IN STUDY (KEY NO.)
- TWP. ROADS NOT INCLUDED IN STUDY
- TWP. ROADS NOT OPENED (R/W EXISTS)
- MAJOR ROADS (UNDER OTHER JURISDICTIONS)
- RAILWAY CROSSINGS (KEY NO.)
- RAILWAYS
- BRIDGES (KEY NO.)
- EXISTING RIGHT-OF-WAY WIDTH
- BY-LAW RIGHT-OF-WAY WIDTH
- STUDY RIGHT-OF-WAY WIDTH

1000 0 1000 2000 3000 4000 5000 6000
SCALE IN FEET

TOWNSHIP OF VAUGHAN ROAD NEEDS STUDY

RIGHT-OF-WAY WIDTHS

PLATE 7

TOWNSHIP OF KING

XI X IX VIII VII VI V IV III II I

HWY NO-50 | LOT-31 | LOT-26 | LOT-21 | LOT-16 | LOT-11 | LOT-6

UNIMPROVED | WEST | UNIMPROVED | HWY NO-27 | HWY NO-400 | ROAD NO-6 | HWY NO-11 (YONGE ST) | LOT-60 | LOT-56 | LOT-51 | LOT-46 | LOT-41 | LOT-36 | LOT-31

COUNTY RD NO-49 | COUNTY ROAD NO-25 | COUNTY ROAD NO-7 | HWY NO-7

NASHVILLE | KLEINBURG | TESTON | HOPE | JEFFERSON | ELGIN MILLS | RICHMOND HILL | MAPLE | VELLORE | SHERWOOD | CARRVILLE | ELDER MILLS | PINE GROVE | WOODBRIDGE | RICHVALE | LANGSTAFF | THORNHILL | EDGELEY | CONCORD

BRANCH | CANADIAN | PACIFIC | HUMBER | RIVER | E HUMBER RIVER | WEST DON RIVER | LITTLE DON RIVER | DON RIVER | RAILWAY | NATIONAL RAILWAY YARD | CANADIAN NATIONAL RAILWAY

EAST BRANCH | HUMBER RIVER | WEST DON RIVER | LITTLE DON RIVER | DON RIVER

COUNTY ROAD NO-6 | COUNTY ROAD NO-27 | COUNTY ROAD NO-400 | COUNTY ROAD NO-7 | COUNTY ROAD NO-27A | COUNTY ROAD NO-6

STEELES AVE | HWY NO-7

TOWNSHIP OF ETOBICOKE | TOWNSHIP OF NORTH YORK | TOWNSHIP OF MARKHAM | TOWNSHIP OF TORONTO ZONE | COUNTY OF PEEL

METROPOLITAN TORONTO

LEGEND

- TWP ROADS INCLUDED IN STUDY (KEY NO) — ⑦
- TWP ROADS NOT INCLUDED IN STUDY
- TWP ROADS NOT OPENED (R/W EXISTS)
- MAJOR ROADS (UNDER OTHER JURISDICTIONS)
- RAILWAY CROSSINGS (KEY NO) — 12
- RAILWAYS
- BRIDGES (KEY NO) — 16
- AUTOMATIC COUNT
- MANUAL COUNT

1000 0 1000 2000 3000 4000 5000 6000
SCALE IN FEET

TOWNSHIP OF VAUGHAN ROAD NEEDS STUDY

LOCATIONS FOR ANNUAL TRAFFIC COUNTS

PLATE 8

20800